South Dakota
Ambient Air Monitoring
Annual Network Plan 2013

South Dakota Department of Environment and Natural Resources
Air Quality Program

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EXECUTIVE SUMMARY

The South Dakota Department of Environment and Natural Resources (department) develops an annual ambient air monitoring network plan which is a review of the ambient air monitoring network each year as required by Title 40 of the Code of Federal Regulation (CFR), Part 58. The review finds the state's ambient air quality concentrations are demonstrating attainment with EPA's National Ambient Air Quality Standards (NAAQS).

The annual plan is published in the department's air quality website to provide public review and comments so adjustments can be made to meet the needs of the general public before the annual plan is finalized. The annual plan includes the following major sections:

1. Ambient air monitoring goals, plans and needs are in Sections 3.0 through 5.0, respectively;
2. Evaluation of collected data compared to the NAAQS is in Section 6.0;
3. Determination of air pollution trends are in Sections 7.0 and 8.0; and
4. Proposed modifications to the ambient air monitoring network to meet the changing trends, national requirements, and state needs are in Section 10.0.

The department will continue to evaluate the following areas for the need to add new ambient air monitoring sites to the ambient air monitoring network:

1. With the change in deicing operations in Rapid City, the department will continue to evaluate the need for new air monitoring sites in the city if problems with dust indicate a need;
2. As monitoring rules and standards are finalized by EPA, there may be a need for new air monitoring sites based on the siting criteria EPA develops; and
3. There continues to be a need to collect up-to-date concentrations in the rural areas of the state. This would be accomplished by setting up a new site if funding is available and test for four consecutive quarters to provide current background levels in areas such as the northwest and central parts of the state for all criteria pollutant parameters and the parameters of ozone, SO_2 and NO_2 in the northeast area.

The department is planning the following site closures and modifications in 2013 and 2014:

1. The department plans to close UC #2 Site because with no current pending large facility in Union County, UC #1 can provide representative data for this area and there is no reason to duplicate sampling in Union County;
2. There is sufficient data from the National Guard Site to conclude the dust from the quarries are having minimal impact on the air quality in this area of the city. Therefore, the department will discontinue sampling for particulate matter (PM10) at this site at the end of 2013.
3. UC #1 Site will have collected carbon monoxide data a total of four years at the end of 2013. Sampling trends indicate little or no change in concentration levels. In addition,

the concentration levels for the 8-hour average and 1-hour average are at 3% and 2% of the standard, respectively. The four years of data provides the necessary background levels that can be used for modeling or other needs for this area. This analyzer will be removed at the end of 2013 and used as backup equipment or setup at a new location; and

4. Plans will be developed on what equipment will be purchased to replace the nine TA Series FH 62 C14 Thermo BETA monitors in the future based on funding. The monitors are no longer being made and are expensive to maintain.

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) through Title 40 of the Code of Federal Regulation (CFR) and the Performance Partnership Agreement requires the South Dakota Department of Environment and Natural Resources (department) to complete an annual ambient air monitoring network plan. EPA's requirements for the annual plan are listed in 40 CFR § 58.10. The annual plan will cover a review of the ambient air monitoring sites and determine if the network is meeting the monitoring objectives in 40 CFR Part 58, Appendixes A, C, D, and E. The annual plan will identify needed modifications to the network such as the termination or relocation of a sampler, termination of an existing station, adding new samplers for a different air pollutant, or the establishment of new stations. The annual plan will also provide an update to existing data for comparison to the National Ambient Air Quality Standards and to determine trends for each sampling parameter.

The department is required to public notice the annual ambient air monitoring network plan for 30 days prior to submitting the plan to EPA. The department complied with this requirement by posting this document on the department's Air Quality Program website at the following location for 30 days:

http://denr.sd.gov/des/aq/airprogr.aspx

All comments received by the department during this 30 day period are addressed by the department and the appropriate changes incorporated in the plan. If a substantial change is made to the plan because of a comment, another 30 day public comment period will be completed. All comments and the department's responses will be posted at the above website. The final annual plan is submitted to EPA for review including all public comments and the department's responses to the comments.

2.0 AMBIENT AIR MONITORING NETWORK HISTORY

In 1972, South Dakota developed and EPA approved a State Implementation Plan (SIP) which included the establishment and operation of an ambient air monitoring network for the state. When the department took delegation of the air quality program from EPA testing was done for total suspended particulate (TSP), sulfur dioxide and nitrogen dioxide at several locations in the state. The EPA sampling network of sites was taken over by the state and modified as necessary to meet the needs of South Dakota. In 1980, South Dakota submitted a revision to its SIP to upgrade the program by establishing a Quality Assurance Project Plan for the monitoring network of state and local air monitoring stations (SLAMS) and special purpose monitoring (SPM) stations.

In 1985, the state set up the first samplers to test for levels of particulate matter 10 microns in diameter or less (PM_{10}) in anticipation of EPA adopting a PM_{10} National Ambient Air Quality Standards (NAAQS). In 1987, the TSP standard was replaced with the new PM_{10} standard. South Dakota submitted a revised ambient air monitoring network plan to include sampling sites for the new PM_{10} standard and shutdown the TSP monitoring network in 1987.

A new standard was added by EPA for particulate matter 2.5 microns in diameter or less ($PM_{2.5}$) in 1997. South Dakota submitted a revised ambient air monitoring network plan to include sampling sites for the new $PM_{2.5}$ standard. In 1999, $PM_{2.5}$ samplers were added to the ambient air monitoring network to determine compliance with the new standard.

In 1997, a new standard was also set for ozone that lowered the concentration level and moved from a one hour to an eight hour average standard. Due to the standard change and concern with the modeling results by the Ozone Transport Assessment Group, the state started an ozone monitoring network which by 2006 included sites in Sioux Falls, Rapid City, and Wind Cave National Park. South Dakota submitted an attainment designation to EPA on April 15, 2003, designating each county as attaining the new ozone standard. On April 30, 2004, EPA published a federal register notice designating each county in the state as attainment/unclassifiable.

In 2006, EPA revised the $PM_{2.5}$ standard significantly by reducing the 24-hour standard from 65 to 35 micrograms per cubic meter. South Dakota submitted an attainment designation to EPA on December 11, 2007, designating each county as attaining the new $PM_{2.5}$ standard. On December 22, 2008, EPA notified the department they were designating each county in the state as unclassifiable/attainment.

In 2008, EPA revised the ozone standard and reduced the standard from 0.08 to 0.075 parts per million. South Dakota is attaining the new standard and submitted a proposed attainment designation package for all counties in the state to EPA on March 6, 2009. The new presidential administration in 2009 asked EPA to stay the implementation of the new ozone standard and re-evaluate the standard. EPA decided to implement the 2008 standard in 2012 so the current standard is 0.075 ppm. On July 20, 2012, EPA designated all counties in the state as unclassifiable/attainment.

The nitrogen dioxide (NO_2) standard was reviewed and a new one-hour standard was set by EPA in 2009. The annual standard was retained without any change in concentration level. The department began monitoring for nitrogen dioxide in 2003 and currently operates nitrogen dioxide monitors in Sioux Falls, Union County, Badlands, and Rapid City. South Dakota submitted an attainment designation to EPA on January 24, 2011, designating each county as attainment for the new one-hour nitrogen dioxide standard. On January 20, 2012, EPA notified the department they were designating each county in the state as unclassifiable/attainment.

EPA also made changes to the air monitoring requirements for lead in 2009. The final rule did not require lead monitoring at the National Core site and all sources in South Dakota have emission levels less than 0.5 ton per year. Therefore, testing for lead is not required at this time. Based on previous lead monitoring and the types of sources in South Dakota, the department submitted an attainment designation to EPA on October 15, 2009, designated each county as attaining the new lead standard. On November 8, 2011, EPA notified the department they were designating each county in the state as attainment/unclassifiable.

The department began testing for levels of carbon monoxide for the first time in 2010, at UC #1 as part of the sampling for the Hyperion project. In 2011, carbon monoxide testing was added to the SD School Site as part of the National Core (NCore) required sampling parameters. The

carbon monoxide standards were reviewed by EPA in 2011, but no changes were made to the standards and no designation recommendations were required because there were no changes. Both sites have concentrations well under the standards and all areas are attaining the current standards.

The sulfur dioxide (SO_2) standard was reviewed and the 24-hour and annual standards were replaced by a new 1-hour standard set by EPA in 2010. The department began monitoring for sulfur dioxide in 2002 and currently operates sulfur dioxide monitors in Sioux Falls, Union County, Badlands, and Rapid City. South Dakota submitted an attainment designation to EPA on June 2, 2011, designating each county as attaining the new one-hour sulfur dioxide standard. The department is waiting on EPA's decision on the state's recommended designations.

In 2012, EPA review and revised the $PM_{2.5}$ annual average standard from 15 ug/m^3 to 12 ug/m^3. The department is submitting a proposal to EPA requesting an attainment designation for each county in the state in 2013.

Data collected from the ambient air monitoring network is entered into the federal database called the Air Quality System (AQS). Individuals interested in reviewing the air quality data can go to the EPA website at the following address:

http://www.epa.gov/airdata/

3.0 AIR MONITORING GOALS

The department's Air Quality Program was established with the primary goal of protecting the health, welfare and property of South Dakotans from the detrimental effects of air pollution. The Clean Air Act of 1970 and subsequent amendments define air quality standards for various air pollutants necessary to protect the public from injurious pollution concentrations. Air pollution concentrations that exceed these established standards can cause "a public health hazard, nuisance, annoyance or damage buildings, property, animals, plants, forests, crops, exposed metals or otherwise interfere with the enjoyment of life or property."

In order to attain and maintain the NAAQS, the department developed regulations that restrict air pollution from sources, establishes these restrictions in an air quality permit, requires periodic inspections to ensure compliance, and maintains an ambient air monitoring network to provide air quality information and monitor the success of the Air Quality Program.

4.0 AIR MONITORING PLAN

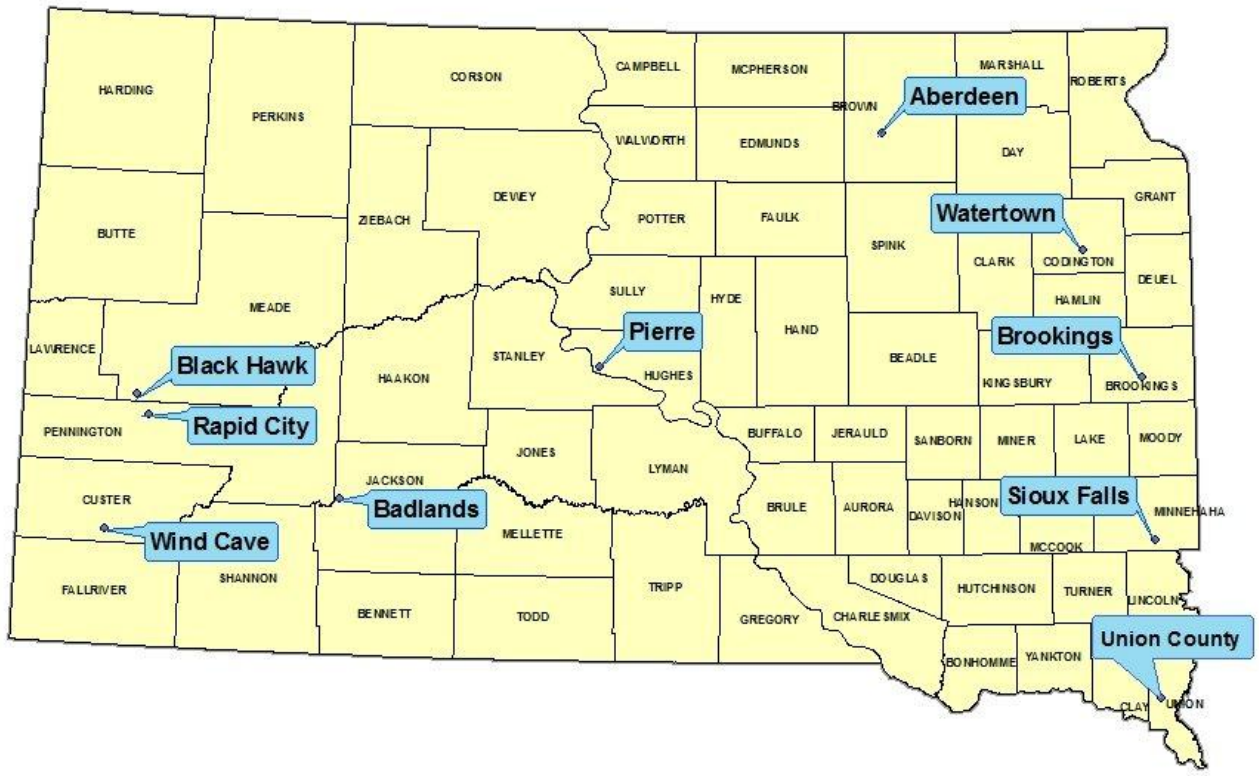
In calendar year 2012, the ambient air monitoring network included 16 ambient air monitoring sites run by the department. Figure 4-1 shows a map of the general locations and cities with ambient air monitoring sites at the beginning of 2012. The following types of ambient air monitors and monitoring sites are operated in South Dakota:

1. State and local air monitoring stations (SLAMS);
2. Special purpose monitors (SPM);
3. Air toxic monitors;
4. Prevention of Significant Deterioration (PSD) monitors;
5. Interagency Monitoring of Protected Visual Environments (IMPROVE) sites;
6. Environmental radiation ambient monitoring systems; and
7. National Core (NCore) multi pollutant sites.

Ambient air monitoring site files are maintained in the department's Pierre office for the SLAMS and SPM sites. The ambient air monitoring site files are available for public review during normal working hours from 8:00 AM to 5:00 PM each workday. The monitoring site files contain at a minimum the following information for each site:

1. AQS site identification form;
2. Sampling location;
3. Sampling and analysis method;
4. Operating schedule;
5. Monitoring objective and spatial scale;
6. Beginning date of operation; and
7. Site maps.

Figure 4-1 – South Dakota Air Monitoring Sites



4.1 State and Local Air Monitoring Stations (SLAMS)

A State and Local Air Monitoring Station consists of an air monitor selected by the state or local air programs to determine compliance with the NAAQS. At the beginning of 2012, 15 of the networks sites had at least one SLAMS monitor for at least one air pollutant parameter. The sites in the network collected PM_{10} data at 12 sites, $PM_{2.5}$ data at 11 sites, sulfur dioxide and nitrogen dioxide at five sites, ozone at six sites and carbon monoxide two sites throughout South Dakota.

4.2 Special Purpose Monitoring (SPM)

A SPM monitor is a generic term for all monitors used for special studies. The data is reported to EPA, the equipment is EPA or non-EPA designated monitoring methods, and the monitoring data is used for special circumstances or needs. Five of the ambient air monitoring network sites operated some kind of SPM monitor in 2012. The parameters tested by the SPM monitors in South Dakota include:

1. Weather stations at the Black Hawk, SD School Research Farm and UC #1 sites;
2. Air toxic monitors at the SD School site;
3. PM_{coarse} monitor, NOy analyzer, and $PM_{2.5}$ speciation monitors at the SD School Site;
4. RC National Guard Site has a SPM monitor to help define the extent of the PM_{10} high concentration area in western Rapid City; and
5. Radiation monitors operated at the Pierre and RC National Guard sites.

4.3 Air Toxics Monitoring Sites

As part of a national research project, air monitors testing for pollutants classified as air toxics are being operated at the SD School Site in Sioux Falls.

Testing for air toxic parameters began in Sioux Falls at the Hilltop Site in 2000 and continued at the SD School Site in 2008. The SD School Site is located near the South Dakota School for the Deaf and the Terry Redlin Elementary grade school. The goal is to determine current concentration levels in South Dakota's largest city.

The air toxic data is reported to the AQS database by the EPA contractor so it can be compared with other national sites and provide baseline levels for South Dakota and used in health studies. Currently, the data collected between 2000 and 2012 have been added by the EPA contractor into the AQS. The last National Air Toxic Assessment completed by EPA included data through 2005. If an individual is interested in reviewing the data they may register with EPA at:

http://www.epa.gov/ttn/atw/natamain/

4.4 Prevention of Significant Deterioration (PSD) Monitoring Sites

In 2012, no Prevention of Significant Deterioration monitoring project were started or completed.

4.5 IMPROVE Network

Two Interagency Monitoring of Protected Visual Environments (IMPROVE) sites are being operated by the National Parks Service in South Dakota. The site locations are at the Badlands and Wind Cave National Park. Data results for parameters collected by the National Park Service can be requested from the individual national parks at:

http://vista.cira.colostate.edu/views/Web/Data/DataWizard.aspx.

4.6 Radiation Network (RadNet)

The RadNet sites in Pierre and Rapid City are being operated as a part of the national network of sampling sites. The Pierre Site has been operated since the early 1980s. The state has a limited role in operating the monitor. The state collects the samples, takes preliminary readings of radioactivity levels, and ships the samples to the EPA office of Radiation and Indoor Air. The type of sample collected is airborne particulates and measurements taken are gross beta radiation levels.

In 2009, EPA requested a second site in the state to be located in the Rapid City area. The new RadNet monitor was installed at the RC National Guard Site on May 7, 2009. The site is operated by the department's Rapid City Regional Office in conjunction with the Rapid City National Guard.

The general objectives of the sampling sites are to provide a means of estimating ambient levels of radioactive pollutants in our environment, to follow trends in environmental radioactivity levels, and to assess the impact of fallout and other intrusions of radioactive materials. Specifically, the RadNet monitor was designed to:

1. Provide a direct assessment of the population's intake of radioactive pollutants due to fallout;
2. Provide data for developing a set of dose computational models for specific sources and a national dose computational model to aggregate all sources and determine total population dose;
3. Monitor pathways for significant population exposure from routine, accidental, and terrorist releases of radioactivity from major sources;
4. Provide data for indicating additional sampling needs or other actions required to ensure public health and environmental quality in the event of a major release of radioactivity to the environment; and
5. Serve as a reference for data comparison with other localized and limited monitoring programs.

The radiation data collected at this site may be reviewed at:

http://oaspub.epa.gov/enviro/erams_query.simple_query

4.7 National Core Multi-Pollutant Site

The National Core (NCore) multi-pollutant monitoring site will provide data on several pollutants at lower detection levels and replaces the National Air Monitoring Station (NAMS) sites that have existed for several years. Each state's ambient air monitoring network is required to have at least one NCore site. Required testing parameters include $PM_{2.5}$ particle mass using continuous and manual monitors, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$ particle mass, ozone , SO_2 , CO, NO/NO_y , wind speed, wind direction, relative humidity, and ambient temperature.

At the beginning of 2011, all required parameters were operating and reporting data for the SD School Site. Data problems were identified with the relative humidity probe and a new probe had to be purchased and installed before accurate data was collected. Valid data was added to the national database with a beginning date in November of 2012.

The NCore site addresses the following monitoring objectives:

1. Timely reporting of data to the public through AirNow for air quality forecasting and other public reporting mechanisms;
2. Support development of emission strategies through air quality model evaluation and other observational methods;
3. Accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors;
4. Support long-term health assessments that contribute to ongoing reviews of the NAAQS;
5. Compliance through establishing nonattainment/attainment areas by comparison with the NAAQS; and
6. Support multiple disciplines of scientific research including public health, atmospheric and ecological.

The NCore site in South Dakota is located on the School for the Deaf campus in Sioux Falls, which is identified as the SD School Site (46-099-0008). This site meets the location requirements to be in an urban residential area. Sioux Falls was selected as the NCore site for South Dakota because it is the largest city in the state and is one of the state's fastest growing communities. See Figure 4-2 for an aerial view of the city urban area around the SD School Site.

The NCore site collects data for trace level sulfur dioxide (SO_2), nitrogen oxides (NO, NO_2 and NOx), all reactive oxides of nitrogen (NO, $NO_{difference}$, and NOy), carbon monoxide (CO), ozone (O_3), $PM_{2.5}$ continuous and filter based manual monitors, $PM_{10\text{-}2.5}$ mass, $PM_{2.5}$ speciated, PM_{10}, air toxics and meteorological parameters of wind speed, wind direction, relative humidity, and ambient temperature.

Figure 4-2 – SD School Site Area Map

5.0 AMBIENT AIR MONITORING NEEDS

5.1 Monitoring State's Largest Population Centers

South Dakota's industrial base and population centers are typical of the northern plains states. The largest industry in the state is agriculture. Most of the other industries are located in several localized areas. The industries in these locations are typically small (less than 50 employees) and generally do not produce large quantities of air pollutants. Most are considered service oriented businesses or light industrial. The only heavy industrial facilities are the Big Stone Power Plant in Grant County and the quarry area in Rapid City.

The population distribution of the state follows the general industrial distribution. Most of the state's population of 814,180, in the 2010 Census, lives either on the eastern or western third of South Dakota. The two largest cities in South Dakota are Sioux Falls and Rapid City located in southeastern and western South Dakota, respectively. The remaining population is primarily spread across the eastern third of the state with the remaining portion of the state sparsely

populated. See Table 5-1 for a list of the 10 largest cities and Table 5-2 for a list of the 10 largest counties in the state.

Table 5-1 – 10 Largest Cities in South Dakota

Ranking	City Name	Counties	Population
1	Sioux Falls	Minnehaha/Lincoln	153,888
2	Rapid City	Pennington /Meade	67,956
3	Aberdeen	Brown	26,091
4	Brookings	Brookings	22,056
5	Watertown	Codington	21,482
6	Mitchell	Davison	15,254
7	Yankton	Yankton	14,454
8	Pierre	Hughes	13,646
9	Huron	Beadle	12,592
10	Vermillion	Clay	10,571

Table 5-2 – 10 Counties with the Highest Populations

Ranking	Counties	Population
1	Minnehaha	169,468
2	Pennington	100,948
3	Lincoln	44,828
4	Brown	36,531
5	Brookings	31,965
6	Codington	27,277
7	Meade	25,434
8	Lawrence	24,097
9	Yankton	22,438
10	Davison	19,504

Given South Dakota's population distribution, most of the air monitoring efforts of the state have in the past been concentrated in the areas of high population. Within these areas of high population, monitoring sites are chosen that will determine areas of high pollution concentration, determine if the NAAQS are being met, identify and attempt to quantify pollutant concentrations emitted by industries, and identify sources that have the potential to release highest amounts of pollutants. Air monitoring sites are currently being operated in or near the five largest cities and seven largest counties in the state.

5.2 Real Time Data

Air monitoring goals have shifted to the collection of data using continuous air monitoring samplers and providing the data as quickly as possible for the public to use. Continuous samplers provide more data at lower operational cost, which is necessary as EPA continues to expand ambient air monitoring programs for the same amount of funding or less. In many cases the continuous emission monitoring can be accessed by telephone and uploaded to a website for

public use. The public can then use this data to determine if they need to take extra precautions when doing outdoor activities. The real time information is also used to monitor PM_{10} and $PM_{2.5}$ concentrations when high wind dust alerts are forecasted for Rapid City and is provided to the public on South Dakota's website at:

http://denr.sd.gov/des/aq/aarealtime.aspx

The department also provides continuous data to the EPA AirNow website as part of the effort to keep the public informed on current air quality levels in the state. In 2012, data collected from the $PM_{2.5}$ monitors and ozone analyzers at Research Farm, UC #3, RC Credit Union and Watertown were added to the AirNow website along with Wind Cave, Badlands, and SD School sites reporting hourly data to the EPA website from previous years. The EPA AirNow webpage can be found at:

http://www.airnow.gov/

The air quality data from South Dakota along with other monitoring sites around the nation provides the public and EPA with near real time data to show current air pollution levels and forecast levels for long range transport. The goal for the future is to add other locations in the state to this website and to the department's website.

5.3 Class I Areas

With the development of coal bed methane in Wyoming, Montana and Colorado, oil and gas production in North Dakota, and more and more evidence of air pollution being transported into the state, there is a growing need for data in rural and small cities in the western part of the state. In addition, South Dakota developed a plan to implement the regional haze regulations required by the federal Clean Air Act. The implementation of these regulations puts more importance on air pollution levels in the state's two class I areas of Badlands and Wind Cave National Parks.

Ambient air monitors were placed in these areas in order to determine background levels and the impact of long range transport of air pollutants like particulate matter, ozone, sulfur dioxide, and nitrogen dioxide. In addition, continuous sampling data is needed to show background level used for modeling purposes in determining air quality permit requirements. The National Park sites collect data from IMPROVE monitors for PM_{10}, $PM_{2.5}$, and chemical analysis of the collected particulates. The department collects PM_{10}, $PM_{2.5}$, sulfur dioxide, nitrogen dioxide, and ozone data at the Badlands Site and PM_{10}, $PM_{2.5}$, and ozone data at the Wind Cave Site.

In previous years testing for sulfur dioxide and nitrogen dioxide was completed at both Class I Areas. An evaluation of the sulfur dioxide and nitrogen dioxide data in the 2010 Annual Plan showed testing results were about the same for both sites, a duplication of sampling effort, so the analyzers were moved from the Wind Cave Site to the next highest priority site at Credit Union in Rapid City starting in 2011.

5.4 Ozone Monitoring

Ozone levels in the nation are being impacted by long range transport from within the nation and internationally. In some cases, states are observing rural ozone levels higher than ozone levels in large cities. This is a serious problem for states in the eastern half of the nation in meeting the current ozone standard and is beginning to be a problem in the western half of the nation. Colorado, Wyoming and Utah are having issues with high ozone levels in their rural areas with some of the highest levels coming in winter months. It will be important to maintain ozone monitoring in all areas of South Dakota to determine if long range transport of air pollution affects ozone concentration in rural and urban areas. Especially as EPA continues to the lower the NAAQS standards closer to background levels measured in South Dakota.

Past national modeling efforts show there is potential for having ozone concentrations near the standard in the east and southeastern parts of the state. Monitoring sites were added in 2008 in Union and Brookings counties to more accurately determine if the population is being exposed to high ozone levels. The eastern third of the state now has three ozone monitoring sites.

The western half of the state has ozone monitors at South Dakota's two Class I areas and at the Black Hawk Site near Rapid City. The department is continuing to evaluate the data being collected at these three sites and impacts from other states to determine if other ozone monitoring in the western part of the state is warranted.

5.5 $PM_{2.5}$ Monitoring

In 2006, EPA significantly lowered the 24-hour $PM_{2.5}$ standard from 65 micrograms per cubic meter (ug/m^3) to 35 ug/m^3. EPA also lowered the annual standard from 15 ug/m^3 to 12 ug/m^3 in 2012. These revisions of the standards brought the compliance levels close to the concentrations recorded at the monitoring sites in the state's network.

Testing for $PM_{2.5}$ levels is now a higher priority in South Dakota because recorded concentrations are significantly closer to the current standards. Sample concentrations in the eastern half of the state are higher than the western half. The southeast part of the state has the highest levels in the state followed by the northeast area.

5.6 Metropolitan Statistical Areas

40 CFR Part 58, Appendix D, contains information used to design an ambient air monitoring network and lists three basic objectives in designing an ambient air monitoring network. The three basic objects are listed below:

1. Provide air pollution data to the general public in a timely manner. The department accomplishes this objective by providing Near Real Time data on the department's website at:

http://denr.sd.gov/des/aq/aarealtime.aspx

The data on this website includes hourly data from the Sioux Falls and Rapid City sites. It also includes other cities like Black Hawk and Watertown sites and rural areas like Union County, Badlands and Wind Cave sites. Specifically in the Rapid City area, High Wind Dust Alerts are called when meteorological conditions are forecasted that could cause high PM_{10} concentrations. This information along with a report graphing hourly concentrations recorded during the alert is also provided to the public through the department's website;

2. Support compliance with ambient air quality standards and emissions strategy development. The department accomplishes this objective by locating the sites throughout the state to assess the permit control measures and pollution emission impacts on the state. For example, the Rapid City air monitoring sites specifically evaluate the permit control measures and the special measures taken to reduce fugitive dust levels; and
3. Support for air pollution research studies. The department supports research by loading the air quality data into EPA's AQS database site and by supporting local studies when requested by the state's colleges.

EPA identified in Appendix D the air monitoring requirements for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. The number of required air monitoring sites for ozone and particulate matter is based on the state's Metropolitan Statistical Areas (e.g., determined by the population of the MSA and each pollutant's design value in the MSA). Each design value is specific to the pollutant and form of the standard. To determine the number of monitoring sites, the design value is calculated based on the pollutant concentration and the applicable form of the standard in 40 CFR Part 50, divided by the applicable pollutant's standard in 40 CFR Part 50, and the results multiplied by 100. The percentage is compared to the values in Appendix D to determine the minimum number of monitoring sites.

If there is no ambient air monitoring data for the MSA, only the minimum number of sites listed in Appendix D is required to be operated. If there is a minimum of three years of air quality data for the MSA, a design value is calculated. If the MSA has a design value greater than 85% of the standards for ozone and $PM_{2.5}$ and 80% of the standard for PM_{10} the required number of sampling sites continues to increase as the population increases. If the highest concentration site in a MSA has a design value less than 80% for PM_{10} and 85% of the standard for other pollution parameters the required number of sites may be one or even zero depending on the design value and population of the MSA.

There is one additional ambient air monitoring requirement in Appendix D for an ozone network. If a MSA is required to have one or more ozone monitor, at least one of the ozone monitoring sites is required to be located at the expected high concentration area for the MSA.

Table 5-3 shows the population, design values and the minimum site requirements for the Sioux Falls, Rapid City, and Sioux City MSAs in the state after adding data for the 2012 sampling year.

Table 5-3 – 40 CFR Part 58, Appendix D Requirements for MSA

2010 MSA Population	Counties	Site	AQS ID	Maximum Design Values	> NAAQS Criteria (Yes or No)	Minimum Sites Required
Sioux Falls MSA						
169,468 44,828 5,618 8,347 **Total: 228,261**	Minnehaha Lincoln McCook Turner	SD School	46-099-0008	$PM_{2.5}$ 24-hour = 63%	No	0
		KELO	46-099-0006	$PM_{2.5}$ 24-hour = 66%		
		KELO	46-099-0006	$PM_{2.5}$ Annual = 74%	No	0
		SD School	46-099-0008	$PM_{2.5}$ Annual = 68%		
		SD School	46-099-0008	Ozone 8-hr = 89%	Yes	1
Rapid City MSA						
100,948 25,434 **Total: 126,382**	Pennington Meade	RC National Guard	46-103-0013	PM_{10} 24-hr = 41%	No	0
		RC Credit Union	46-103-0020	PM_{10} 24-hr = 71%		
		Black Hawk	46-093-0001	PM_{10} 24-hr = 24%		
		RC Library	46-103-1001	PM_{10} 24-hr = 34%		
		RC Credit Union	46-103-0020	$PM_{2.5}$ 24-hr = 43%	No	0
		RC Library	46-103-1001	$PM_{2.5}$ 24-hr = 46%		
		RC Credit Union	46-103-0020	$PM_{2.5}$ Annual = 44%	No	0
		RC Library	46-103-1001	$PM_{2.5}$ Annual = 49%		
		Black Hawk	46-093-0001	Ozone 8-hr = 80%	No	0
Sioux City MSA						
14,399 6,000 21,006 102,172	Union (SD) Dixon & Dakota (NE) Woodbury (IA)	UC #1	46-129-0001	PM_{10} 24-hr = 49%	No	0
		UC #2	46-129-0002	PM_{10} 24-hr = 49%		
Total: 143,577		UC #1	46-129-0001	$PM_{2.5}$ 24-hr = 69%	No	0
		UC #2	46-129-0002	$PM_{2.5}$ 24-hr = 69%		

2010 MSA Population	Counties	Site	AQS ID	Maximum Design Values	> NAAQS Criteria (Yes or No)	Minimum Sites Required
		UC #1	46-129-0001	$PM_{2.5}$ Annual = 80%	No	0
		UC #2	46-129-0002	$PM_{2.5}$ Annual = 70%		
		UC #3	46-129-0003	Ozone 8-hr = 85%	No	0

The department operates the following additional types of monitors to meet the specific network requirements in 40 CFR Part 58, Appendix D:

1. $PM_{2.5}$ speciation monitor in Sioux Falls at the SD School Site; the largest urban area in the state;
2. $PM_{2.5}$ background and transport monitors at the Badlands and Wind Cave sites; and
3. NCore Site located in the City of Sioux Falls at the SD School Site.

Another requirement in Appendix D is providing for a Photochemical Assessment Monitoring Stations (PAMS) which is required in areas classified as serious, severe, or extreme nonattainment for ozone. South Dakota is not required to have a PAMS site.

There are no Appendix D required population air monitoring sites for carbon monoxide. The only carbon monoxide air monitoring site requires is at the National Core Site. Carbon monoxide air monitoring started at the SD School Site in 2011.

There are population monitoring requirements for nitrogen dioxide but the core based statistical area (CBSA) must have a population level of 500,000 or greater. EPA can also require a special monitoring site if a state has a population considered as susceptible or vulnerable. There is no population based or special monitoring sites for nitrogen dioxide required by EPA for South Dakota.

Sulfur dioxide has a population based monitoring requirement for a CBSA. The monitoring requirement is based on a calculation using the total amount of sulfur dioxide, in tons, emitted within the counties in the CBSA area and the population within the CBSA counties. The calculation is called the population weighted emissions index for the CBSA. Union County is part of the Sioux City CBSA and is the only area in South Dakota with a population weighted emissions index that has a value high enough to require a monitoring site. The EPA rules require the monitoring site to be located in the parent CBSA or Sioux City, Iowa area in this case. No population weighted emissions index required sulfur dioxide monitoring sites are required in South Dakota.

The minimum requirements for lead are based on the lead air emissions from a source or airport with an annual emissions rate of 0.5 tons per year. There are no sources with an emission rate at or over 0.5 ton per year so there are no required monitoring sites in South Dakota.

5.7 Additional Monitoring

There is currently minimal monitoring being completed in other parts of the state that have small, but expanding populations and industries. These areas include the northeastern and the northern Black Hills portions of the state. These areas will continue to be evaluated to determine whether additional monitoring efforts need to be concentrated in those areas.

A new site will be considered for the northwest part of the state when funding is available to collect background data. Currently, there is a need for updated background data for this area of the state to determine if current and future development in oil and gas production in neighboring states is impacting the area.

PM_{10}, $PM_{2.5}$, sulfur dioxide, and nitrogen dioxide, and ozone will be the focus of the ambient air monitoring network as levels of these pollutants have the greatest potential to have concentrations close to the standard as EPA continues to lower the NAAQS for these pollutants.

6.0 COMPLIANCE WITH NAAQS

This section provides a comparison of the collected data to the NAAQS. The comparison determines if an area is attaining the standard. In addition, the comparison assists in determining if more monitoring stations for certain parameters is needed in an area or an area no longer needs to monitor for a certain parameter or parameters.

6.1 Particulate Matter (PM_{10}) – Attainment Status

The PM_{10} NAAQS is based on a 24-hour average concentration. The maximum 24-hour average concentration allowed is 150 micrograms per cubic meter (ug/m^3). Based on EPA's rounding mechanism, a 24-hour average concentration of 154.4 ug/m^3 is the highest level that still attains the 24-hour standard for PM_{10}. Attainment with the 24-hour standard is demonstrated when there is less than or equal to one expected exceedance averaged over three years.

In 2012, the statewide PM_{10} monitoring network included 12 monitoring locations. Four of the sites recorded data using manual monitors providing 24-hour sample concentrations. Eight of the sites had continuous samplers providing 1-hour concentrations. The main distribution of the PM_{10} air monitoring sites is located in Rapid City with three sites. Two sites are operated in central Union County for preconstruction, construction and post construction of the Hyperion Energy Center. Other city locations with one site include the Sioux Falls, Badlands, Wind Cave, Aberdeen, Watertown, Black Hawk, and Brookings.

Table 6-1 contains a list of the expected exceedance rate, 2nd highest 24-hour PM_{10} concentrations, three year average of 2nd highest 24-hour PM_{10} concentration (design value), and attainment status for the PM_{10} ambient air monitors throughout the state for calendar year 2010 to 2012. Since the 24-hour standard allows for one expected exceedance per year the 2nd highest maximum 24-hour concentration displayed in Table 6-1 helps determine how close a site is to exceeding the 24-hour standard. Using a 3-year average value (design value) reduces the impact from an unusually high concentration in one year and is a better comparison of the actual pollution levels.

Table 6-1 – Statewide PM_{10} 24-Hour Concentrations

Site	Expected Exceedance Rate	Yearly 2nd Maximum 24-hour	2012 Design Value	Attainment?	Percent Standard
RC Library	0	2010 – 61 ug/m^3 2011 – 48 ug/m^3 2012 – 45 ug/m^3	51 ug/m^3	Yes	34%
RC National Guard	0	2010 – 73 ug/m^3 2011 – 58 ug/m^3 2012 – 54 ug/m^3	62 ug/m^3	Yes	41%
RC Credit Union	0	2010 – 97 ug/m^3 2011 – 117 ug/m^3 2012 – 104 ug/m^3	106 ug/m^3	Yes	71%

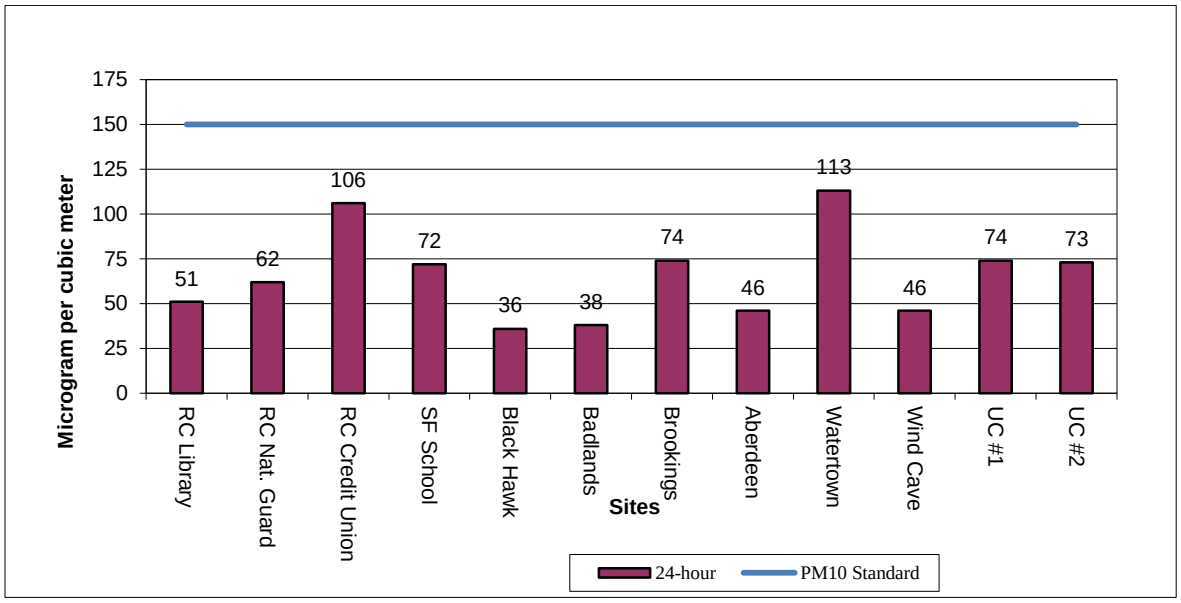
Site	Expected Exceedance Rate	Yearly 2nd Maximum 24-hour	2012 Design Value	Attainment?	Percent Standard
Black Hawk	0	2010 – 29 ug/m^3 2011 – 41 ug/m^3 2012 – 38 ug/m^3	36 ug/m^3	Yes	24%
SF School	0	2010 – 60 ug/m^3 2011 – 2012 – 72 ug/m^3	(2)		
Badlands	0	2010 – 31 ug/m^3 2011 – 46 ug/m^3 2012 – 37 ug/m^3	38 ug/m^3	Yes	25%
Brookings	(1)	2010 – 81 ug/m^3 2011 – 57 ug/m^3 2012 – 83 ug/m^3	74 ug/m^3	Yes	49%
Aberdeen	0	2010 – 46 ug/m^3 2011 – 29 ug/m^3 2012 – 62 ug/m^3	46 ug/m^3	Yes	31%
Watertown	(1)	2010 – 125 ug/m^3 2011 – 107 ug/m^3 2012 – 106 ug/m^3	113 ug/m^3	Yes	75%
Wind Cave	0	2010 – 67 ug/m^3 2011 – 30 ug/m^3 2012 – 40 ug/m^3	46 ug/m^3	Yes	31%
UC #1	0	2010 – 66 ug/m^3 2011 – 68 ug/m^3 2012 – 87 ug/m^3	74 ug/m^3	Yes	49%
UC #2	0	2010 – 82 ug/m^3 2011 – 65 ug/m^3 2012 – 72 ug/m^3	73 ug/m^3	Yes	49%

(1) – Site had a 24-hour PM_{10} concentration greater than the standard under exceptional event conditions of high winds in 2011. An exceptional event demonstration is being developed to support the exclusion of this sampling day from a NAAQS calculation for both sites data sets; and
(2) – Site has less than three years of data for 24-hour PM10 data.

Sites with a PM_{10} design value 80% or greater than the NAAQS have a potential to have a 24-hour sample exceed the PM_{10} standard. The site design values for PM_{10} concentration are all less than 80% of the 24-hour standard as calculated using the data between 2010 and 2012.

Figure 6-1 shows a graph of the design value for each PM_{10} site and is based on the data in Table 6-1. The design value is the calculated average of the yearly 2nd maximum 24-hour average from the most resent consecutive 3-years of data.

Figure 6-1 – 2012 PM_{10} Design Values Statewide



Watertown Site replaced the RC Credit Union Site as the highest PM_{10} design value in the state at 113 ug/m^3 or 75% of the standard. The design value at Watertown Site increased about 8.7% in 2012 compared to the design value in 2011.

The RC Credit Union Site was the next highest design value in 2012 at 71% of the standard. The design value for this site decreased by about 6% in 2012 compared to the design value calculated in 2011.

The expected exceedance rates for the 24-hour PM_{10} standard are calculated using the last 3-years of data (i.e., 2010 to 2012). The Wind Cave Site's design value changed significantly in 2012 and decreased by 33 ug/m^3 when the 2009 sampling year fell out of the 3-year calculation. In addition the Wind Cave Site expected exceedance level changed back to 0.

In 2010 and 2012, there were no 24-hour PM_{10} samples that had concentrations greater than the National Ambient Air Quality Standard of 150 ug/m^3. In 2011, two sites had PM_{10} concentrations greater than the standard. Both happened on the same day (October 6, 2011). A high wind event along with very dry soil conditions affected both sites. The Watertown Site had a 24-hour concentration of 157 ug/m^3. The Brookings Site had a 24-hour concentration of 161 ug/m^3. The sampling days were flagged by the department and an exceptional event package is being put together to determine if these concentrations are exceptional events. The department will request EPA's concurrence if the investigation demonstrates the high concentrations were caused by an exception event.

Currently, all the sites in South Dakota are attaining the PM_{10} 24-hour standard.

6.2 Particulate Matter ($PM_{2.5}$) – Attainment Status

The $PM_{2.5}$ NAAQS consists of a 24-hour and annual standard. The 24-hour standard is 35 ug/m^3. Attainment of the 24-hour standard is achieved when the maximum 24-hour average concentration, based on the annual 98th percentile averaged over three years (24-hour average design value), is less than or equal to 35 ug/m^3. The $PM_{2.5}$ annual standard was revised in 2012 from 15 ug/m^3 to 12 ug/m^3. Attainment is demonstrated when the maximum annual arithmetic mean averaged over three consecutive years (annual design value) is equal to or less than 12 ug/m^3.

The testing for $PM_{2.5}$ concentrations is one of the major priorities for the state because EPA continues to lower the standard. EPA revised the 24-hour standard significantly lower by 46% in 2006. In 2012, there were eleven $PM_{2.5}$ SLAMS sites operated in the state. Partisol 2000, a Federal Reference Method manual monitor was operated at five of the $PM_{2.5}$ sites. Met One BAM continuous $PM_{2.5}$ monitors with Federal Equivalent Method designation were operated at seven of the sites. The SD School Site operates both methods and the remaining six sites have only the Met One BAM continuous $PM_{2.5}$ monitor.

6.2.1 $PM_{2.5}$ 24-Hour Standard

Table 6-2 shows the yearly 24-hour 98th percentile for calendar years 2010 to 2012 used in the calculation of the 24-hour design value for $PM_{2.5}$ in 2012, the 24-hour design value, and designation status of each site. In 2012, the highest 24-hour 98th percentile concentration was 22.6 ug/m^3 or 65% of the standard and was recorded at the Aberdeen Site. The second highest 24-hour 98th percentile concentration in 2012 was at the Watertown Site at 21.5 ug/m^3 collected on a Met One BAM continuous $PM_{2.5}$ monitor.

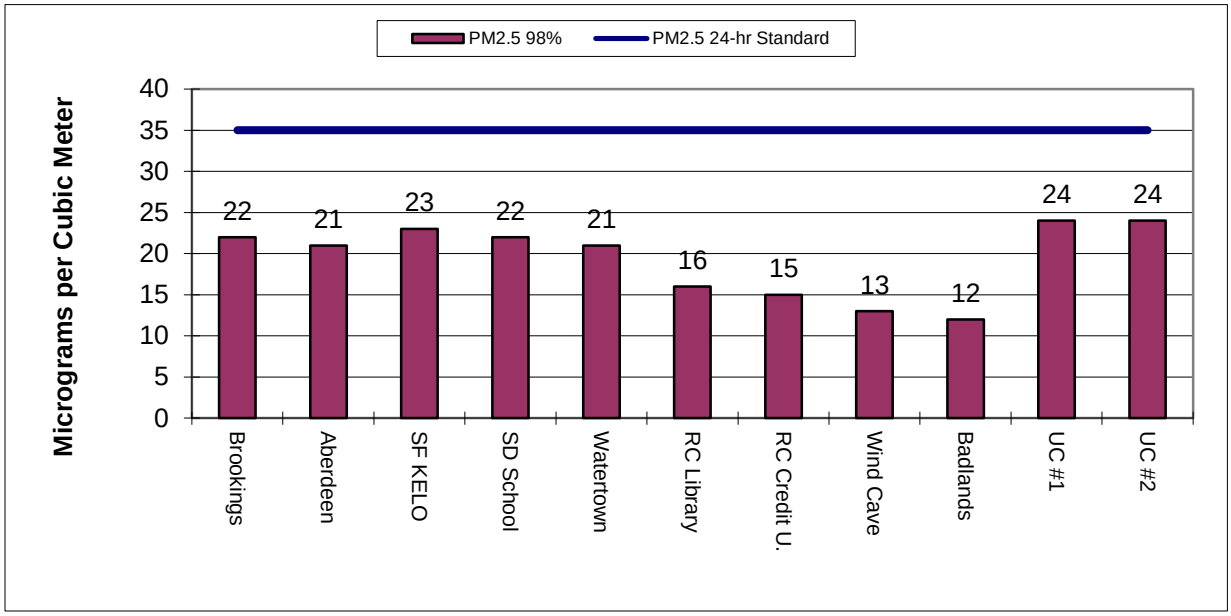
Table 6-2 – Statewide $PM_{2.5}$ 24-Hour Concentrations

Site	Yearly 98th Percentile	24-hour Design Value 2012	Attainment Status	Percent Standard
RC Library	2010 – 20.7 ug/m^3 2011 – 12.3 ug/m^3 2012 – 14.5 ug/m^3	16 ug/m^3	Yes	46%
RC Credit Union	2010 – 14.0 ug/m^3 2011 – 13.1 ug/m^3 2012 – 17.1 ug/m^3	15 ug/m^3	Yes	43%
Badlands	2010 – 13.6 ug/m^3 2011 – 10.0 ug/m^3 2012 – 12.9 ug/m^3	12 ug/m^3	Yes	34%
SF KELO	2010 – 27.8 ug/m^3 2011 – 21.5 ug/m^3 2012 – 20.8 ug/m^3	23 ug/m^3	Yes	66%
SF SD School	2010 – 29.0 ug/m^3 2011 – 19.4 ug/m^3	22 ug/m^3	Yes	63%

Site	Yearly 98th Percentile	24-hour Design Value 2012	Attainment Status	Percent Standard
	2012 – 17.3 ug/m^3			
Brookings	2010 – 25.7 ug/m^3 2011 – 18.4 ug/m^3 2012 – 20.6 ug/m^3	22 ug/m^3	Yes	63%
Aberdeen	2010 – 26.2 ug/m^3 2011 – 15.6 ug/m^3 2012 – 22.6 ug/m^3	21 ug/m^3	Yes	60%
Watertown	2010 – 23.9 ug/m^3 2011 – 18.4 ug/m^3 2012 – 21.5 ug/m^3	21 ug/m^3	Yes	60%
Wind Cave	2010 – 12.4 ug/m^3 2011 – 11.5 ug/m^3 2012 – 14.9 ug/m^3	13 ug/m^3	Yes	37%
UC #1	2010 – 27.8 ug/m^3 2011 – 23.1 ug/m^3 2012 – 19.7 ug/m^3	24 ug/m^3	Yes	69%
UC # 2	2010 – 29.2 ug/m^3 2011 – 21.0 ug/m^3 2012 – 20.8 ug/m^3	24 ug/m^3	Yes	69%

Figure 6-2 contains a graph of the 24-hour design values for each site. The highest design value was recorded at the UC #1 and #2 sites with a concentration of 24 ug/m^3 or 69% of the standard. The KELO Site in Sioux Falls had the next highest design value at 23 ug/m^3. As expected, the background sites at Badlands and Wind Cave had the lowest 24-hour design values for $PM_{2.5}$ at 13 ug/m^3 and 12 ug/m^3, respectively. All sites had a small increase or stayed the same in concentration levels with the addition of the 2012 data and are attaining the 24-hour $PM_{2.5}$ standard.

Figure 6-2 – 2012 $PM_{2.5}$ Statewide 24-Hour design values



When using the 98th percentile standard one or two 24-hour $PM_{2.5}$ concentrations greater than the standard at a continuous monitoring site will not affect the 24-hour design value or the area attainment status because the 98th percentile may be the 7th or 8th highest reading for the year. But these concentrations may affect the annual design value and need to be considered when evaluating the data results for each year. A conceptual theory on what caused the high concentrations can be formed and further developed in future years. In some cases if local sources are causing the problem early actions can be taken to reduce concentration levels and further protect public health from high levels of $PM_{2.5}$.

In 2010, two events recorded 24-hour $PM_{2.5}$ concentrations greater than 35 ug/m^3 at different monitoring sites. The first event occurred from October 20 to October 23 when a federal prescribed fire burned the area near the Wind Cave Site. This is the second time in two years that a prescribed fire caused high $PM_{2.5}$ concentrations. Concentrations during the first day of the event were 115.0 ug/m^3 on the continuous monitor and 111.8 ug/m^3 on the manual monitor. On the second day of the fire, the $PM_{2.5}$ concentration was 54.5 ug/m^3 on the continuous monitor. On the following days concentrations were below the standard and continued to move lower until the fire burned out. Both days that had $PM_{2.5}$ concentrations over the standard were flagged as exceptional events due to a federal prescribed fire. The department will not need to request an exceptional event for these high concentrations because they did not cause a violation of the $PM_{2.5}$ 24-hour standard. In addition, this event is not expected to re-occur because the department is working with the federal land managers on a Smoke Management Plan as part of the Regional Haze Program to minimize the impacts of federal prescribed fires in South Dakota.

The second event in 2010 with $PM_{2.5}$ concentrations greater than the standard occurred on February 5 and 6 on the eastern edge of the state. An alert notice was issued by Minnesota and Iowa because meteorological conditions were expected to increase pollution levels and transport $PM_{2.5}$ air pollution into the region. The Minnesota alert notice indicated the high concentration

levels were air pollution from long range transport of $PM_{2.5}$ air pollution to the east and southeast. The weather during this period of time included light winds and fog with snow on the ground which further reduces the dispersion of $PM_{2.5}$ pollutants.

On February 5, 2010 all three continuous $PM_{2.5}$ monitor sites on the southeastern corner of the state had concentrations over the standard. UC #1 Site had the highest concentration at 46.1 ug/m^3 followed close by SD School and UC #2 sites in the lower 40 ug/m^3 range. On February 6 only UC #1 Site had a concentration over the standard at 36.2 ug/m^3. SD School and UC #2 sites had concentrations just under the standard. The other sites in the eastern half of the state are on an every third day schedule and did not have samples for these days.

During 2011 and 2012, none of the monitoring sites had a concentration greater than the 24-hour $PM_{2.5}$ standard. The highest 24-hour $PM_{2.5}$ concentration in 2012 was recorded in the eastern part of the state. On January 22, 2012, the $PM_{2.5}$ monitors at Brookings, Watertown, SD School, UC #1 and UC #2 sites had concentrations in the range of 28 ug/m^3 to 31 ug/m^3 range. Just as in 2010 the high $PM_{2.5}$ levels were high over a large part of the eastern edge of South Dakota. Using the AirNow meteorology back track trajectory modeling shows air mass movement for the day as coming from the south with movement from areas with fires in Kansas and Oklahoma.

6.2.2 $PM_{2.5}$ Annual Standard

Table 6-3 contains a list of the annual averages, annual design values and attainment status for each of the $PM_{2.5}$ sites using the data from 2010 to 2012. The highest annual average concentration in 2012 was recorded at the Watertown Site at 11.0 ug/m^3. The second highest annual concentration was at the UC #1 Site with an annual average of 9.9 ug/m^3. The Badlands Site had the lowest annual average at 4.1 ug/m^3 in 2012, slightly higher than in 2011.

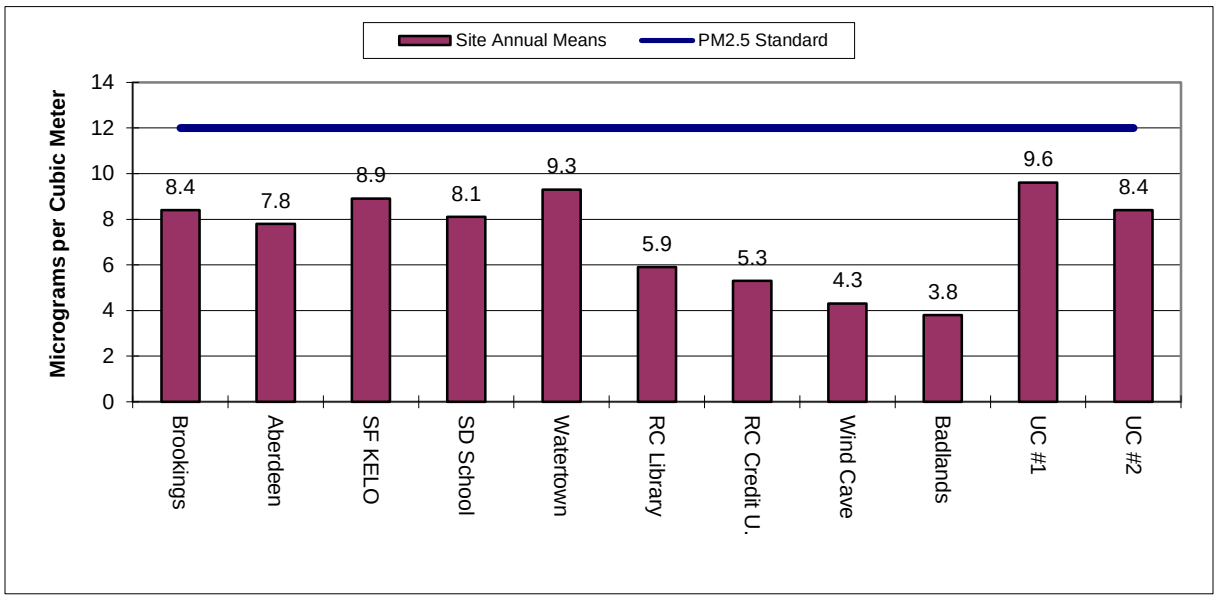
Table 6-3 – Statewide $PM_{2.5}$ Annual Concentrations

Site	Annual Averages	2012 Annual Design Values	Attainment Status	Percent Standard
RC Library	2010 – 6.6 ug/m^3 2011 – 5.4 ug/m^3 2012 – 5.8 ug/m^3	5.9 ug/m^3	Yes	49%
RC Credit Union	2010 – 6.6 ug/m^3 2011 – 4.5 ug/m^3 2012 – 6.3 ug/m^3	5.3 ug/m^3	Yes	44%
Badlands	2010 – 3.9 ug/m^3 2011 – 3.5 ug/m^3 2012 – 4.1 ug/m^3	3.8 ug/m^3	Yes	32%
KELO	2010 – 9.2 ug/m^3 2011 – 8.7 ug/m^3 2012 – 8.7 ug/m^3	8.9 ug/m^3	Yes	74%
SD School	2010 – 10.3 ug/m^3 2011 – 8.0 ug/m^3 2012 – 6.0 ug/m^3	8.1 ug/m^3	Yes	68%

Site	Annual Averages	2012 Annual Design Values	Attainment Status	Percent Standard
Brookings	2010 – 8.6 ug/m^3 2011 – 7.9 ug/m^3 2012 – 8.6 ug/m^3	8.4 ug/m^3	Yes	70%
Aberdeen	2010 – 8.7 ug/m^3 2011 – 7.1 ug/m^3 2012 – 7.5 ug/m^3	7.8 ug/m^3	Yes	65%
Watertown	2010 – 8.9 ug/m^3 2011 – 8.1 ug/m^3 2012 – 11.0 ug/m^3	9.3 ug/m^3	Yes	78%
Wind Cave	2010 – 4.7 ug/m^3 2011 – 3.7 ug/m^3 2012 – 4.9 ug/m^3	4.3 ug/m^3	Yes	36%
UC #1	2010 – 9.6 ug/m^3 2011 – 9.3 ug/m^3 2012 – 9.9 ug/m^3	9.6 ug/m^3	Yes	80%
UC #2	2010 – 9.6 ug/m^3 2011 – 8.2 ug/m^3 2012 – 7.5 ug/m^3	8.4 ug/m^3	Yes	70%

Figure 6-3 contains a graph of the $PM_{2.5}$ annual average design value for each site. None of sites in the network had a 2012 design value that exceeded the annual $PM_{2.5}$ standard. The 2012 annual design value for each site followed the same pattern as the 24-hour levels. The highest design values occur in the eastern third of the state. The highest annual design value occurred at the UC #1 Site with a level of 9.6 ug/m^3 which is 80% of the annual standard. The lowest $PM_{2.5}$ annual design value occurred at the Badlands Site with a concentration of 3.8 ug/m^3 which is 32% of the annual standard.

Figure 6-3 – 2012 $PM_{2.5}$ Statewide Annual Design Values



6.3 Lead – Attainment Status

During the early 1980's, the department conducted lead sampling. The levels detected were well below the NAAQS levels at that time. After passage of the 1990 Clean Air Act Amendments, there were concerns with the way EPA instructed states in determining if those areas were in attainment of the lead standard. For this reason, a monitoring site was established in April 1992, at the Jaehn's Site in Rapid City to determine compliance with the standard. This site was selected because it was downwind of GCC Dacotah, which is a cement plant that burns coal and has the potential to emit lead. The results of the analyzed data from the second quarter of 1992 through the first quarter of 1994 showed lead levels well below the NAAQS. Due to the low concentrations of lead in Rapid City, the sampling site was terminated at the end of the first quarter in 1994.

EPA changed the lead NAAQS on October 15, 2008. The change significantly lowers the lead standard from 1.5 ug/m^3 to 0.15 ug/m^3 based on the annual maximum three month rolling average. Attainment of the lead NAAQS is achieved if the annual maximum three month rolling average, averaged over a three year period, is less than or equal to 0.15 ug/m^3.

In 2010, EPA completed a rule change that requires source type testing in addition to network testing if a source has emissions of 0.5 tons or greater per year. None of the facilities in South Dakota's emissions inventory have lead emissions at or greater than 0.5 tons per year so no source related testing is required at this time.

The rule originally required lead testing at the NCore Site. The final rule required lead testing at NCore Site only if the site is located in city with a 500,000 and greater population. The NCore site is located in Sioux Falls and the city has a population under 500,000 so no testing is

required. Currently, there are no lead sampling sites planned for South Dakota because of the low potential for concentrations of lead pollution.

The lead sampling in the past and current emissions levels indicates South Dakota is attaining the new lead standard.

6.4 Ozone – Attainment Status

Ozone monitoring in South Dakota continues to be one of the priority air pollutants because concentrations are close to the standard. Ozone concentrations have not changed significantly in the state but the revisions of the standard brings the concentration closer to the state's levels.

In 2012, the department operated ozone monitors at six sites throughout South Dakota. The following is a list of the six sites and a short history for each site:

1. In 1999, the first ozone monitor was setup in South Dakota and located at the Sioux Falls Hilltop Site. Beginning in 2008, the Hilltop Site had to be moved and a new location was found at the School for the Deaf campus. The move to a new location was required because the city of Sioux Falls had to revert the Hilltop property back to the original owner when the water tower system was replaced ending the agreement to use the property.
2. In 2000, a second ozone monitor was added at the Robbinsdale Site in Rapid City. In 2005, the Rapid City ozone monitoring site was moved to the RC Credit Union Site because of the planned move of the Robbinsdale sampling shelter to the Wind Cave Site. Air dispersion modeling results completed by the department showed the RC Credit Union Site does not meet location requirements in 40 CFR Part 58 because it is located in the middle of the one microgram impact area for nitrogen dioxide from industrial sources in Rapid City. Nitrogen dioxide emissions artificially lower ozone levels for a short distance from the source so concentrations will not reflect the actual area levels. Because of the nitrogen dioxide emissions the ozone analyzer was moved from the RC Credit Union Site to the Black Hawk Site in 2007.
3. In 2003, the National Parks Service added an ozone monitor to the Badlands Site. It is located in a shelter next to the IMPROVE monitors near the park visitor center/headquarters.
4. In 2005, a fourth ozone site was added at the Wind Cave Site. The Wind Cave Site was added to determine if a large increase in oil and gas production in Colorado, Wyoming and Montana would impact the Wind Cave National Park, which is a Class I area.
5. In 2008, a fifth site was added north of Brookings at the Research Farm. The site was setup and operated in cooperation with the 3M Company and Valero Renewable Fuels Company as part of the issuance of a Prevention of Significant Deterioration permit.
6. In 2009, because of an application for a Prevention of Significant Deterioration permit a sixth site was added in the area of the proposed project in Union County UC #3 Site.

In 2008, EPA adopted a new ozone standard at 0.075 parts per million. The form of the standard remained as the fourth highest, daily 8-hour average, averaged over three years (ozone design value). In 2011, EPA implemented the 0.075 part per million standard. EPA is also completing

a 5-year review of the ozone standard in 2012 and when completed could further lower the standard.

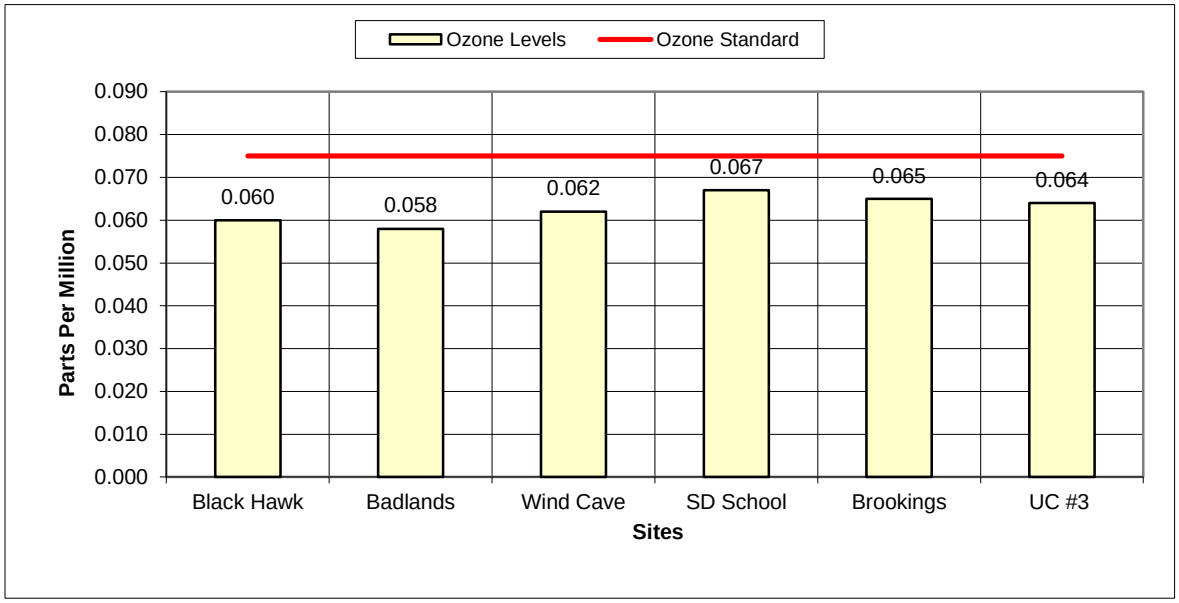
The 2012 design value in parts per million for each of the sites can be seen in Table 6-4 and Figure 6-4. In 2012, the SD School Site had the highest 3-year average ozone concentrations in the state at 0.067 ppm, which is 89% of the 2008 revised ozone standard.

Table 6-4 – Statewide Ozone 4th highest Concentrations

Site	4th Highest Concentration	3-year Average Design Values	Attainment Status	Percent Standard
SD School	2010 – 0.064 ppm 2011 – 0.065 ppm 2012 – 0.072 ppm	0.067 ppm	Yes	89%
Research Farm	2010 – 0.064 ppm 2011 – 0.064 ppm 2012 – 0.067 ppm	0.065 ppm	Yes	87%
Black Hawk	2010 – 0.057 ppm 2011 – 0.057 ppm 2012 – 0.068 ppm	0.060 ppm	Yes	80%
Badlands	2010 – 0.058 ppm 2011 – 0.052 ppm 2012 – 0.064 ppm	0.058 ppm	Yes	77%
Wind Cave	2010 – 0.059 ppm 2011 – 0.060 ppm 2012 – 0.069 ppm	0.062 ppm	Yes	83%
UC #3	2010 – 0.062 ppm 2011 – 0.062 ppm 2012 – 0.068 ppm	0.064 ppm	Yes	85%

The SD School Site replaced the Wind Cave Site as the state's highest concentration site in the state for the first time in 2010 and continues as the highest ozone site. The second highest location is Research Farm Site at 0.065 ppm also located in the eastern edge of the state. Since 2008, both the Wind Cave and Badlands sites are reporting significantly lower ozone design values with the Badlands now the lowest site in the state. Ozone concentrations had a significant increase in design values by about 0.003 ppm for most of the sites statewide in 2012.

Figure 6-4 – 2012 Ozone Design Values Statewide



Currently, the ozone concentrations at the South Dakota School Site in Sioux Falls and Research Farm Site near Brookings are greater than 85% of the standard at the end of 2012. However, the data collected in the past three years demonstrates South Dakota is attaining the national ozone standard.

6.5 Sulfur Dioxide – Attainment Status

The first testing for sulfur dioxide was done by EPA in the early in the 1970s and was continued by the department when the monitoring network was taken over by the state in 1978. The sampling used a pararosaniline bubbler sampler. Because of operational problems with the test method, the high detection levels and low sampling results testing was discontinued in the 1980s. The department began monitoring again for sulfur dioxide using a continuous method in 2002.

In 2012, the department operated sulfur dioxide monitors at five monitoring sites throughout South Dakota. The analyzers were located at SD School, Badlands, RC Credit Union, UC #1, and UC #2 sites.

EPA made a major change to the sulfur dioxide standard in 2009 replacing the 24-hour and annual primary standard with a new 1-hour standard. The 1-hour sulfur dioxide standard concentration is 75 parts per billion (ppb) based on the three year average of the yearly 99th percentile level (1-hour design value). The 3-hour secondary standard for sulfur dioxide was not changed by EPA during the review. The secondary sulfur dioxide standard is based on a 3-hour average concentration of 0.500 ppm, not to be exceeded more than once per year.

6.5.1 Sulfur Dioxide 1-Hour Standard

Table 6-5 contains the yearly 99th percentile concentration, the 1-hour design value, the attainment status, and the percentage of the standard for each site. The site sulfur dioxide design values are based on sulfur dioxide data collected in 2010 to 2012. The highest 99th percentile 1-hour level in 2012 was recorded at the RC Credit Union Site at 10 ppb. The UC #1 Site had the second highest 1-hour concentration at 9 ppb.

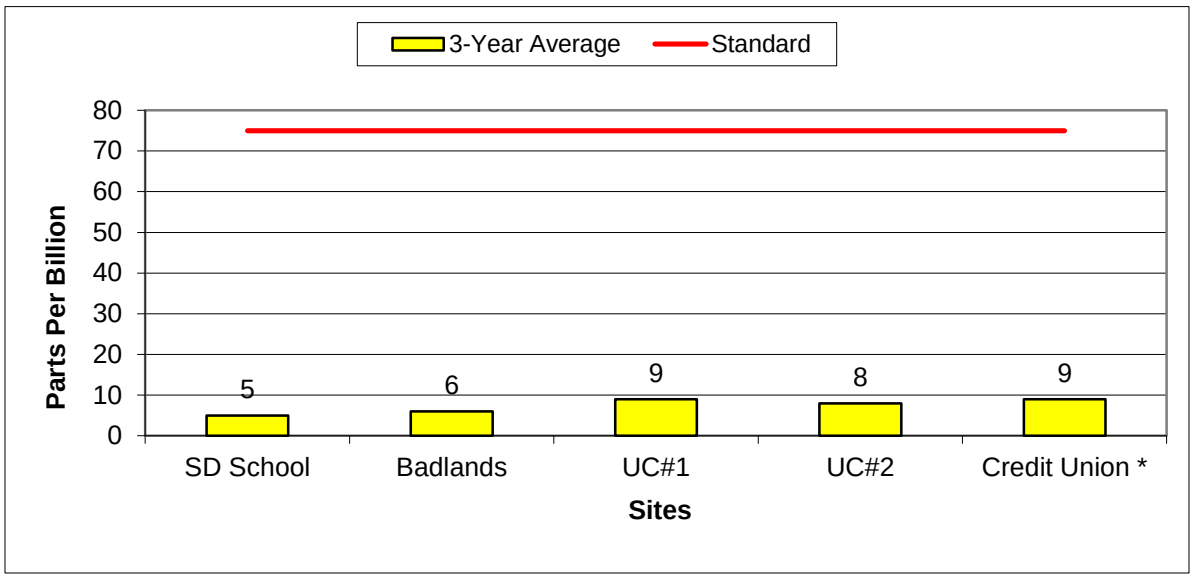
Table 6-5 – 2012 Statewide Sulfur Dioxide 1-hour Design Values

Site	99th Percentile Concentration	3-year Average Design Values	Attainment Status	Percent Standard
SD School	2010 – 5 ppb 2011 – 4 ppb 2012 – 6 ppb	5 ppb	Yes	7%
RC Credit Union	2010 – 2011 – 8 ppb 2012 – 10 ppb	9 ppb	[1]	12%
Badlands	2010 – 9 ppb 2011 – 6 ppb 2012 – 3 ppb	6 ppb	Yes	8%
UC #1	2010 – 12 ppb 2011 – 7 ppb 2012 – 9 ppb	9 ppb	Yes	12%
UC #2	2010 – 9 ppb 2011 – 8 ppb 2012 – 7 ppb	8 ppb	Yes	11%

[1] – Site with less than three years of air monitoring data. The department is unable to compare the results to the sulfur dioxide 1-hour standard until three years of data is obtained.

Figure 6-5 shows the three year average of the yearly 99th percentile 1-hour concentration for each of the sites in the network for 2012. All five of the sites recorded concentrations well under the 1-hour standard. The highest 1-hour design value was recorded at the Credit Union Site with a maximum concentration of 10 ppb which is 13% of the standard. The second highest was recorded at the UC #1 and Credit Union sites with a concentration of 9 ppb which is 12% of the standard.

Figure 6-5 – 2012 Sulfur Dioxide 1-Hour Concentrations



* – RC Credit Union Site has less than three years of air monitoring data. The department is unable to compare the results to the 1-hour sulfur dioxide standard until three years of data is obtained.

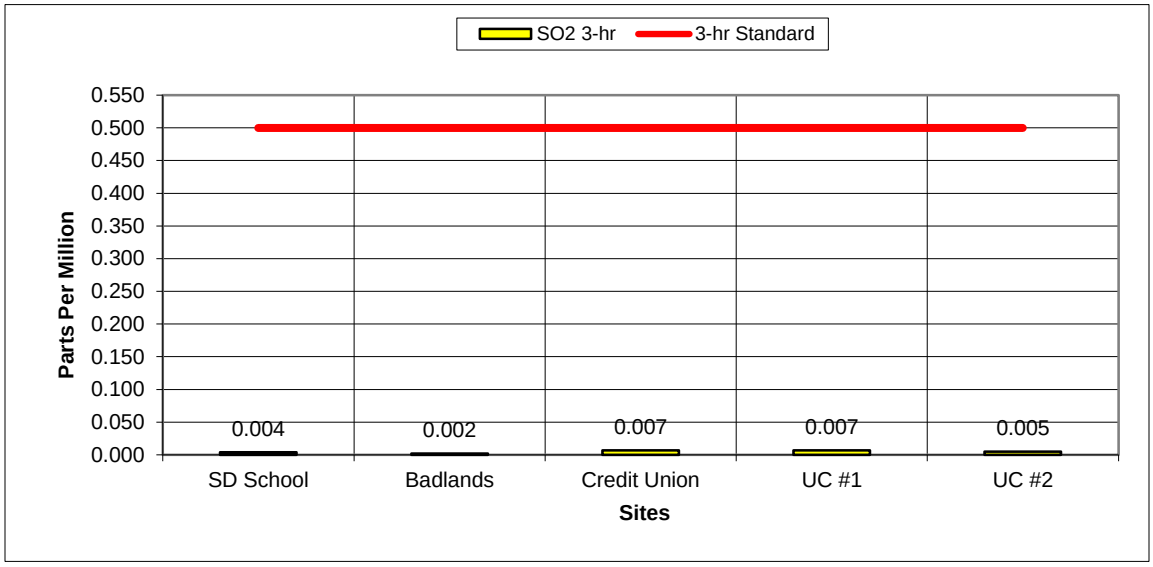
The data collected in the past three years demonstrates that South Dakota is attaining the new 1-hour sulfur dioxide standard.

6.5.2 Sulfur Dioxide 3-Hour Secondary Standard

The graph in Figure 6-6 shows the second maximum 3-hour concentrations for five sites in the network in 2012. The 3-hour sulfur dioxide concentrations for all of the sites are very low. The UC #1 and RC Credit Union sites recorded the highest 3-hour average in 2012 with a concentration of 0.007 ppm at 1% of the 3-hour standard. The lowest concentration was recorded at the Badlands Site at 0.002 ppm or 0.4% of the standard.

The data collected in the past three years demonstrates that South Dakota is attaining the 3-hour secondary standard for sulfur dioxide.

Figure 6-6 – 2012 Sulfur Dioxide 3-hour Concentrations



6.6 Nitrogen Dioxide – Attainment Status

The first testing for nitrogen dioxide was done by EPA in the 1970s and was continued by the department when the monitoring network was taken over by the state in 1978. The sampling used a sodium arsenite bubbler sampler. Because of operational problems with the test method, the high detection levels and low sampling results testing was discontinued in the 1980s. The department began monitoring again for nitrogen dioxide using a continuous method in 2002.

Beginning in 2010 the standard for nitrogen dioxide was revised by adding a 1-hour standard of 100 ppb and keeping the annual arithmetic mean standard of 53 ppb. Attainment is demonstrated when the 3-year average of 98th percentile daily maximum 1-hour concentration is less than or equal to 100 ppb (1-hour design value) and the annual arithmetic mean is less than or equal to 53 ppb (annual design value).

There were five nitrogen dioxide ambient air monitoring sites operated in 2012. The locations were at the SD School, Badlands, RC Credit Union, UC #1, and UC #2 sites.

6.6.1 Nitrogen Dioxide 1-Hour Standard

Table 6-6 contains the 1-hour 98th percentile concentration for each of the last three years, 1-hour design values, the attainment status, and percentage of the standard for each site. The UC #2 Site had the highest yearly 98th percentile 1-hour concentration at 57.0 ppb which is over four times the level in previous years. The higher concentrations, caused by an unknown emission source, only impacted this site and not the UC #1 Site during the 4th quarter of 2012. Nitrogen dioxide concentrations began to rise in the latter part of August and continued to increase until it peaked on December 31, 2012. After that day concentrations decreased significantly and then moved slowly back to levels previously recorded at the site by the end of January 2013. The department

investigated the incident but could not find a source or sources that would cause the higher concentrations; but will continue to investigate the incident. The second highest 1-hour concentration for 2012 was recorded at the Credit Union Site at 42.2 ppb.

Table 6-6 – Nitrogen Dioxide 1-hour 98th Percentile Concentrations

Site	98th Percentile Concentration	3-year Average Design Values	Attainment Status	Percent Standard
SD School	2010 – 48.0 ppb 2011 – 38.6 ppb 2012 – 36.6 ppb	41 ppb	Yes	41%
Badlands	2010 – 5.0 ppb 2011 – 4.4 ppb 2012 – 6.9 ppb	5 ppb	Yes	5%
RC Credit Union	2010 – 2011 – 47.0 ppb 2012 – 42.2 ppb	45 ppb	[1]	45%
UC #1	2010 – 22.0 ppb 2011 – 14.8 ppb 2012 – 15.9 ppb	18 ppb	Yes	18%
UC #2 [2]	2010 – 20.0 ppb 2011 – 14.3 ppb 2012 – 57.0 ppb	30 ppb	Yes	30%

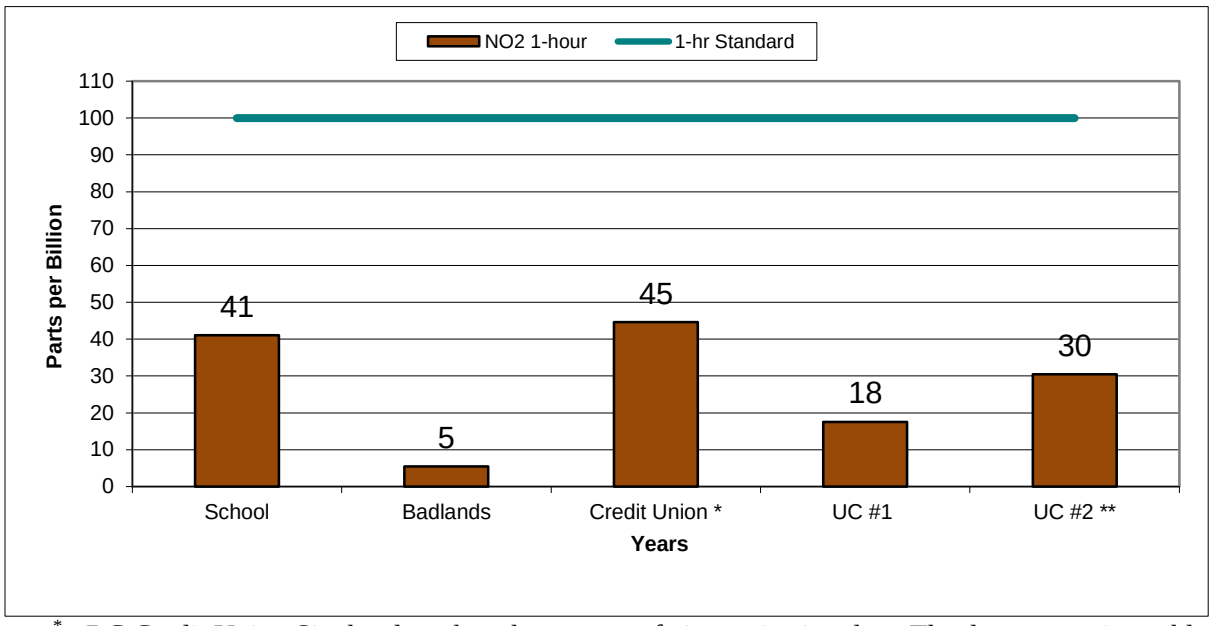
[1] – Site with less than three years of air monitoring data. The department is unable to compare the results to the nitrogen dioxide 1-hour standard until three years of data is obtained.

[2] - UC #2 had an unusual event in the 4th quarter of 2012 causing site data to be elevated above normal levels. The data collected during this incident beginning in September and ending in December 2012 was flagged and should not be used for modeling or any regulatory purpose.

Figure 6-7 shows the nitrogen dioxide 1-hour design values for each of the sites with three years of data. The RC Credit Union Site had the highest concentration but only has two years of data. SD School Site recorded the next highest 1-hour nitrogen dioxide design value at 41 ppb or 41% of the standard. Rural areas impacted by a large source of nitrogen dioxide emissions like at UC #2 record higher concentrations than typical of a background site but the levels are still well under the standard.

The data collected in the past three years demonstrates that South Dakota is attaining the 1-hour standard for nitrogen dioxide.

Figure 6-7 – 2012 Nitrogen Dioxide 1-hour Design Values



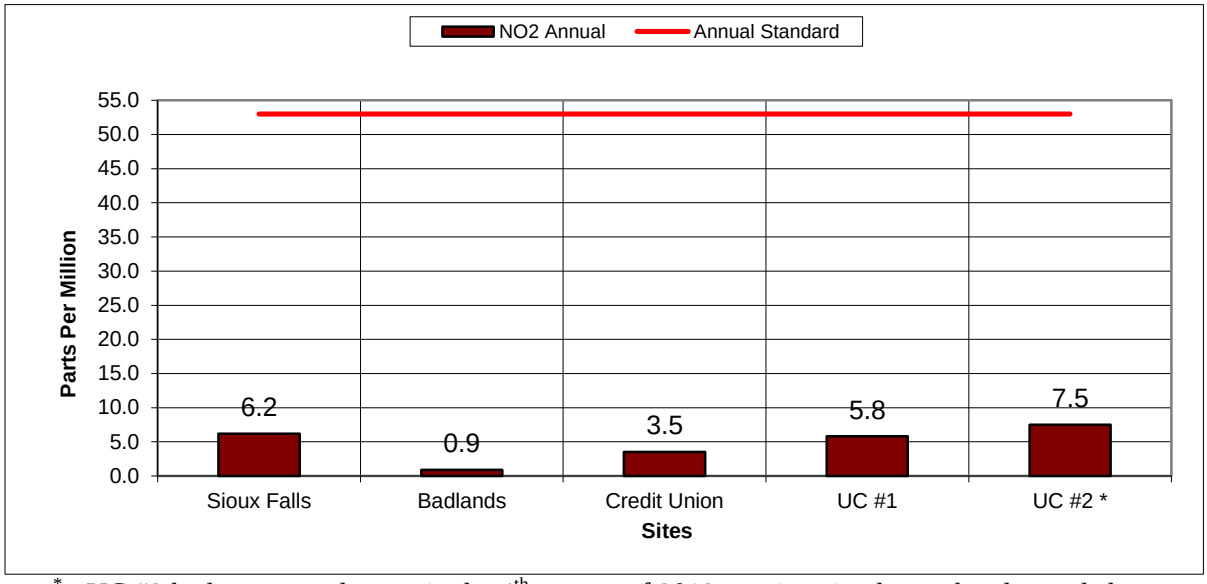
* - RC Credit Union Site has less than three years of air monitoring data. The department is unable to compare the results to the 1-hour nitrogen dioxide standard until three years of data is obtained.
** - UC #2 had an unusual event in the 4th quarter of 2012 causing site data to be elevated above normal levels. The data collected during this incident beginning in September and ending in December 2012 was flagged and should not be used for modeling or any regulatory purpose.

6.6.2 Nitrogen Dioxide Annual Standard

Figure 6-8 shows the annual average for the five sites operated in 2012. The highest nitrogen dioxide annual average was recorded at the UC #2 Site at 7.5 ppb driven by the high concentrations in the 4th quarter of 2012. The Badlands Site remained the lowest site in South Dakota at 0.9 ppb.

The data collected in the past three years demonstrates that South Dakota is attaining the annual standard for nitrogen dioxide.

Figure 6-8 – 2012 Nitrogen Dioxide Annual Concentration



* - UC #2 had an unusual event in the 4th quarter of 2012 causing site data to be elevated above normal levels. The data collected during this incident beginning in September and ending in December 2012 was flagged and should not be used for modeling or any regulatory purpose.

6.7 Carbon Monoxide – Attainment Status

The department started the operation of the first carbon monoxide analyzer in January of 2010 at UC #1 Site in Union County. A second analyzer was added to the SD School Site as required by the National Core sampling requirements and began testing at the start of 2011.

The carbon monoxide standard is based on two primary standards in the form of a one-hour and 8-hour average concentration. The one-hour standard is 35.0 ppm and is not to be exceeded more than once per year. The highest 1-hour concentration of carbon monoxide recorded at the SD School Site was 1.6 ppm in 2012. The 8-hour average standard is 9.0 ppm, not to be exceeded more than once per year. The highest 8-hour average was recorded at the SD School Site at 0.8 ppm in 2012.

Figure 6-9 shows the carbon monoxide 1-hour maximum concentrations for both sites. Figure 6-10 shows the carbon monoxide maximum 8-hour average concentrations for both sites. The carbon monoxide concentrations are very low at both sites. The data at UC #1 represents background levels of carbon monoxide collected in a rural area in eastern South Dakota. It is anticipated by the department that carbon monoxide levels at UC #1 represent one of the higher concentration locations for a rural area given the traffic counts on Interstate 29 near the sampling site. Other rural areas with less traffic emissions could have lower concentrations. The carbon monoxide concentrations at the SD School Site represent urban areas being collected in an area that has some of the highest traffic counts in the state.

Figure 6-9 – Carbon Monoxide 1-Hour Concentration

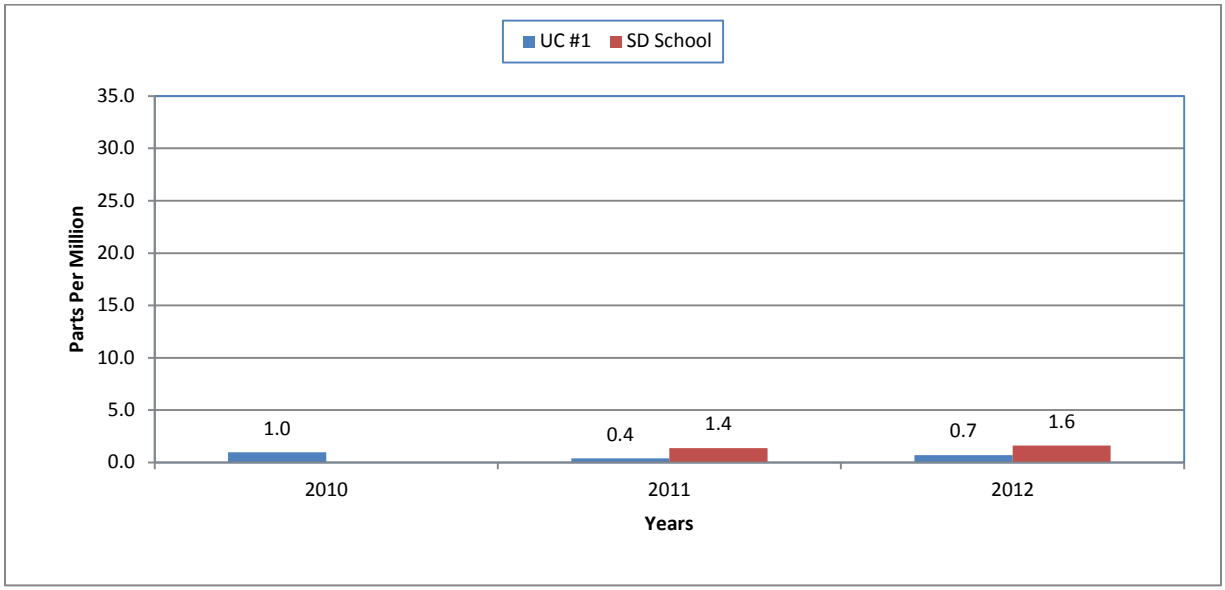
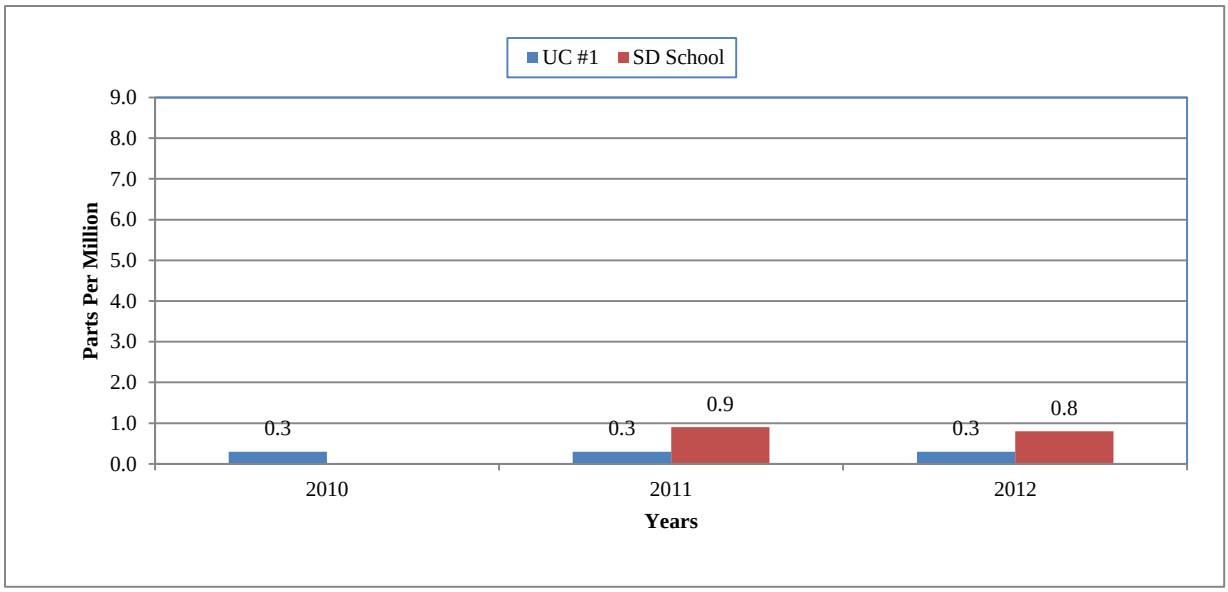


Figure 6-10 – Carbon Monoxide 8-Hour Average Concentration



The data collected in the past three years demonstrates that South Dakota is attaining the annual standard for carbon monoxide at the UC #1 Site. One more year of data is need for the department to determine if the SD School Site is attaining the standard.

6.8 2012 High Concentration Summary

High concentration days affect the design values and need to be considered when evaluating the data results for each year. A conceptual theory on what caused the high concentrations can be formed and further developed in future years. In some cases if local sources are causing the problem early actions can be taken to reduce concentration levels and further protect public health from high levels.

The concentrations used for evaluating high sampling readings by the department were calculated using a level of 90% of the current standard, except for ozone. The ozone concentration level used to determine which high days would be evaluated is based on an EPA previously proposed standard of 0.070 ppm. The evaluation level for each parameter is as follows:

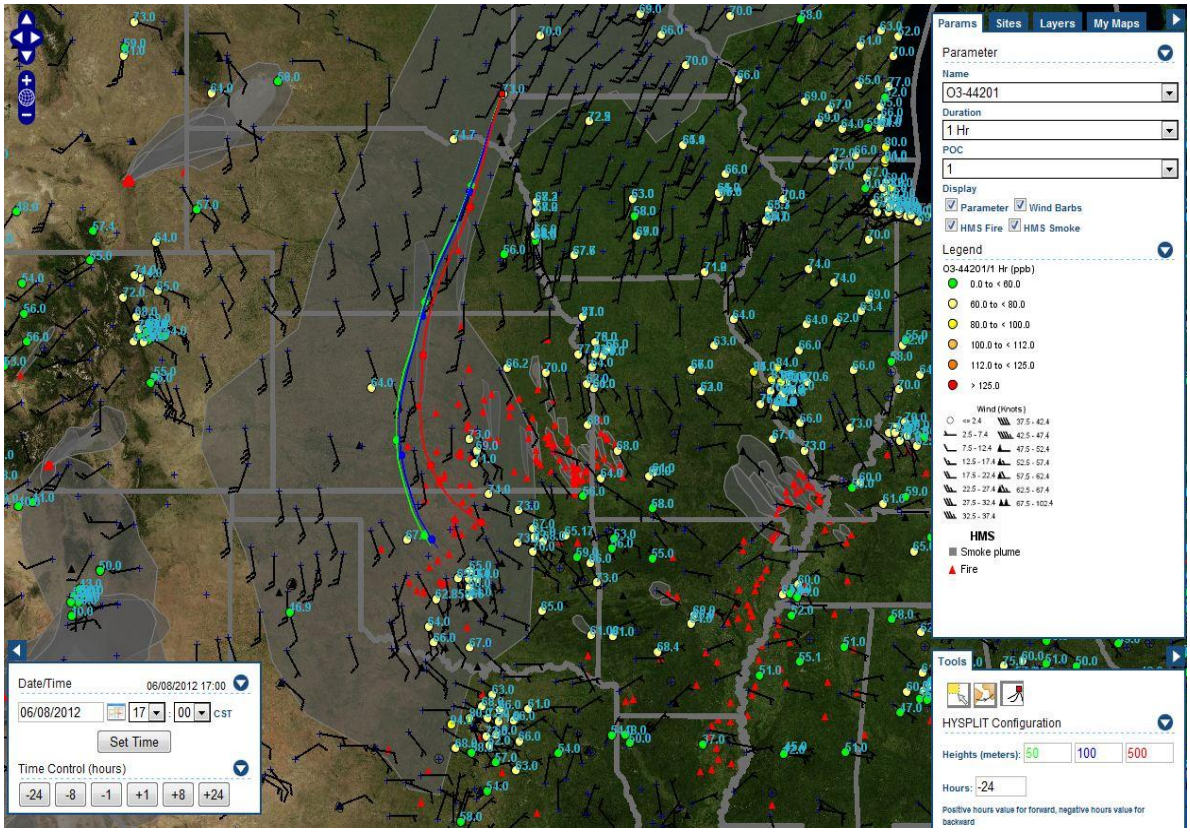
1 Ozone > 0.070 ppm 8-hour average;
2 $PM_{2.5}$ > 32 ug/m^3 24-hour average;
3 PM_{10} > 135 ug/m^3 24-hour average;
4 NO_2 > 90.0 ppb 1-hour maximum;
5 SO_2 > 67.0 ppb 1-hour maximum;
6 CO > 8.1 ppm 8-hour average; and
7 CO > 31.5 ppm 1-hour average maximum.

A review of the data showed there were no concentrations over the evaluation level for $PM_{2.5}$, PM_{10}, SO_2, NO_2 and CO at the following sites in 2012: Aberdeen, Badlands, Brookings, RC Credit Union, RC Guard Camp, RC Library, KELO, UC #1, and Watertown.

During 2012, there were 19 high concentrations above the evaluation level for ozone. None of the concentrations for ozone were greater than the standard. The 19 readings occurred during the following time span, one day in May, four days in June, five days in July and five days in August. For ozone there were two days with high readings at the Black Hawk Site, two days with high readings at the Research Farm Site, 11 days with high readings at the SD School Site, one day with high readings at the UC #3 Site and three days with high readings at the Wind Cave Site. The high concentration days were looked at in AIRNow-Tech showing the concentrations, fire layer, smoke layer, and wind with back trajectories. There seems to be a strong correlation between the high ozone readings and fire events for all of the evaluation days. An example of this is shown in Figure 6-11.

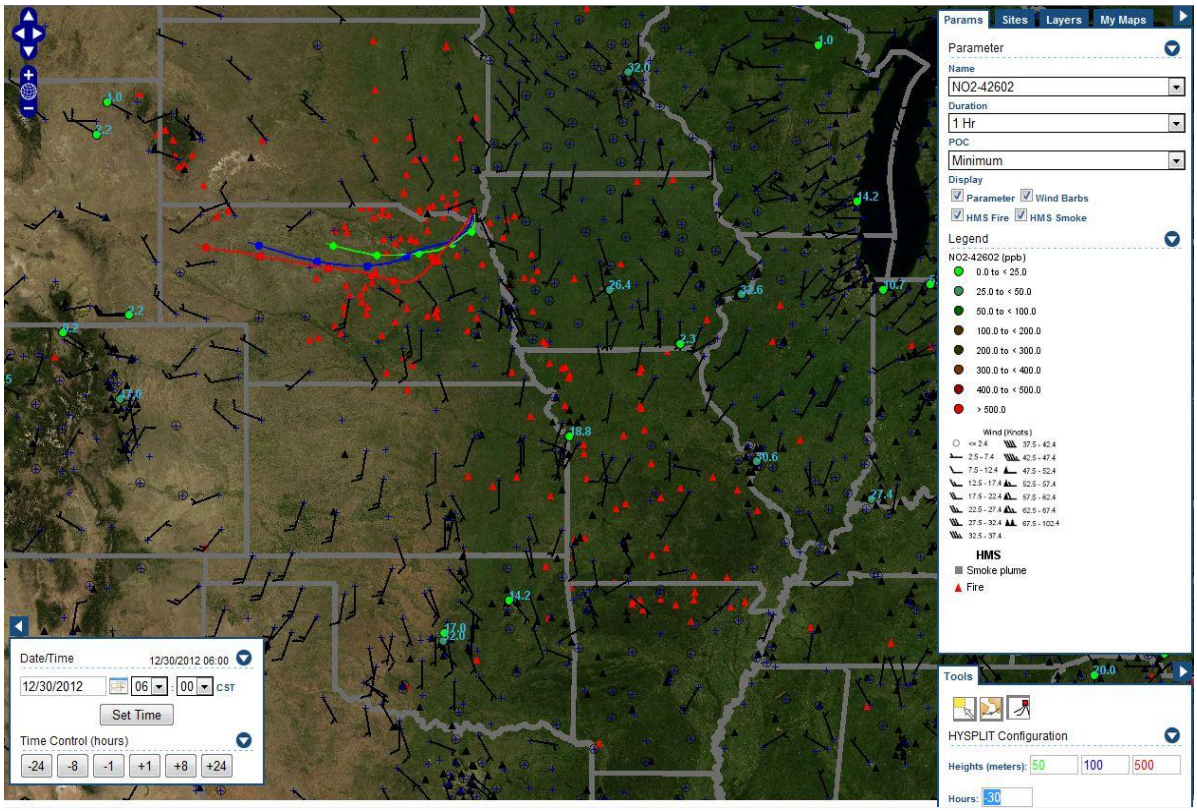
The highest ozone concentration day was recorded at Wind Cave with a concentration right at the standard of 0.075 ppm. Fire events in Wyoming and Colorado may have added to the concentrations on this day but the major cause was documented as a stratospheric ozone intrusion by Colorado, Wyoming and Utah. Air monitoring sites in these states had readings over the standard from this event on June 6, 2012. This day was the second highest ozone concentration day for the year at the Black Hawk Site at 0.070 ppm.

Figure 6-11 - Example of AIRNow-Tech Map for Ozone



The other high concentration days occurring in 2012 were for NO2 at the UC #2 Site. These occurred on the last four days of the year. Three of these last four days had concentrations that exceeded the standard. The event did not cause a violation of the standard but did almost double the design values for UC #2 Site. These readings are very unusual and were not seen at the nearby UC #1 Site. A cause has not been determined at this point. An example of the AIRNow-Tech map is shown in Figure 6-12.

Figure 6-12 - Example of AIRNow-Tech Map for NO2



7.0 AIR MONITORING SITE EVALUATION AND TRENDS

This section will discuss the goals of each air monitoring site in the network and trends for each pollutant. Through this evaluation a determination is made if site goals are being met and if each testing parameter is needed at the site. This section also has site specific information tables including AQS ID #, location, operation, data use, sampling schedule, monitoring objectives, spatial scale, and sampling and analytical methods required as part of the annual plan requirements in 40 CFR Part 58.

7.1 Rapid City Area

The Rapid City area had a total of three monitoring sites collecting data in 2012. The high concentration site for PM_{10} was located at the RC Credit Union Site. A continuous PM_{10}, $PM_{2.5}$, SO_2 and NO_2 monitors were used to determine compliance with the NAAQS standards and determine current concentration levels. The RC Library and RC National Guard sites had manual Andersen PM_{10} monitors collecting 24-hour data using a filter based gravimetric sampling method. In addition, the Library Site had manual Andersen $PM_{2.5}$ monitors collecting 24-hour data using a filter based gravimetric sampling method.

In cooperation with the city of Rapid City, Pennington County, and industry, the department implemented a Natural Events Action Plan for the Rapid City area in 1996. Part of this plan alerts the public of the potential for high dust levels caused by high winds and to advise the public to take precautions during the high wind events. Under this plan high wind dust alerts are called when the following forecast conditions occur:

1. Hourly wind speeds exceed 20 miles per hour;
2. Peak wind gusts are greater than 40 miles per hour; and
3. Five consecutive days of 0.02 inches or less of precipitation each day excluding dry snow.

During 2012, a total of nineteen high wind dust alerts were called for the Rapid City area. None of the days exceeded the PM_{10} 24-hour standard. The highest 24-hour average concentration recorded during an alert was on September 11, 2012 at 102.5 ug/m^3. This demonstrates the implementation of the Natural Events Action Plan for the Rapid City area is still working to maintain PM_{10} concentrations below the NAAQS during high wind events.

In the fall of 2008, a surface water quality problem was found when Rapid Valley began using Rapid Creek for a drinking water source. Testing indicated high levels of chlorides during snow melt events caused the drinking water to smell and the water treatment plant had to stop producing drinking water until chloride levels dropped. Testing indicated liquid deicer used on the streets during snow and ice events was causing the problem. The city of Rapid City began a process of reducing the use of liquid deicer and increasing the use of river sand in the eastern and south eastern parts of Rapid City to help reduce chloride levels in Rapid Creek. The department is working with Rapid City to determine which streets can be changed from chemical deicer to sand so air quality levels are not being affected. Currently, the changes to the sanding material in the city have not cause high concentrations of PM_{10}.

7.1.1 RC Library Site

The RC Library Site is located on the library building in Rapid City. The site was established in 1972, and it is the oldest sampling site in South Dakota still operating. The site is geographically located in the downtown area of the city east of the hogback and in the Rapid Creek river valley. The site purpose is to evaluate population exposure, fugitive dust controls, the success of the street sanding and sweeping methods employed by the city of Rapid City and general concentration levels in the eastern part of the city. Figure 7-1 shows a picture of the RC Library Site.

Figure 7-1 – RC Library Site [1]

[1] - Looking east

PM_{10} sampling began at the site in 1985. $PM_{2.5}$ monitors were added to the site in 1999. In 2012, the Andersen RAAS 100 $PM_{2.5}$ monitors were replaced with R&P Partisol 2000 monitors. Table 7-1 contains details on the monitoring site specific to the requirements in 40 CFR Part 58.

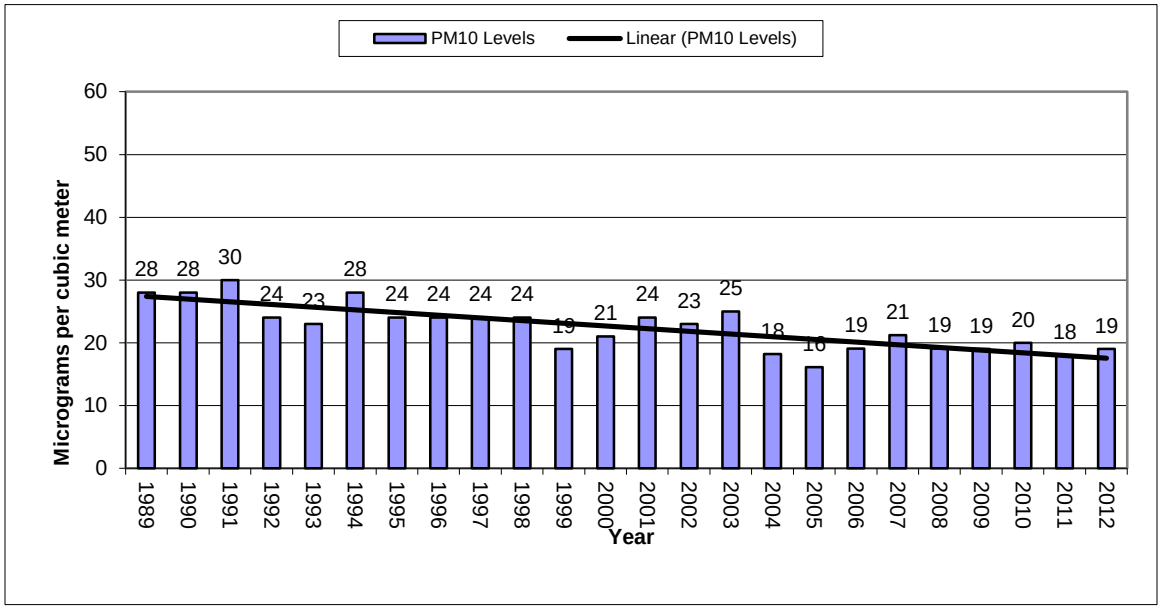
Table 7-1 – RC Library Site Specifics

Parameter	Information
Site Name	RC Library
AQS ID Number	46-103-1001
Street Address	6th and Quincy, Rapid City, South Dakota
Geographic Coordinates	UTM Zone 13, NAD 83, E 641,837.99, N 4,882,111.77
MSA	Rapid City
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS),
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0202-143
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	R&P Partisol 2000 $PM_{2.5}$ w/VSC Cyclone
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.1.1.1 RC Library Site – PM_{10} Data

Annual average PM_{10} concentrations for the RC Library Site are shown in Figure 7-2. The PM_{10} concentrations show a gradual decline from a high of 30 ug/m^3 in 1991, to a low of 16 ug/m^3 in 2005. The largest reduction in annual concentrations came when changes were implemented by the city on the street sanding and sweeping operations in the early 1990s. In the last seven years, annual concentrations have leveled off and are almost steady with a 1 or 2 ug/m^3 change per year.

Figure 7-2 – RC Library Site – PM_{10} Annual Averages



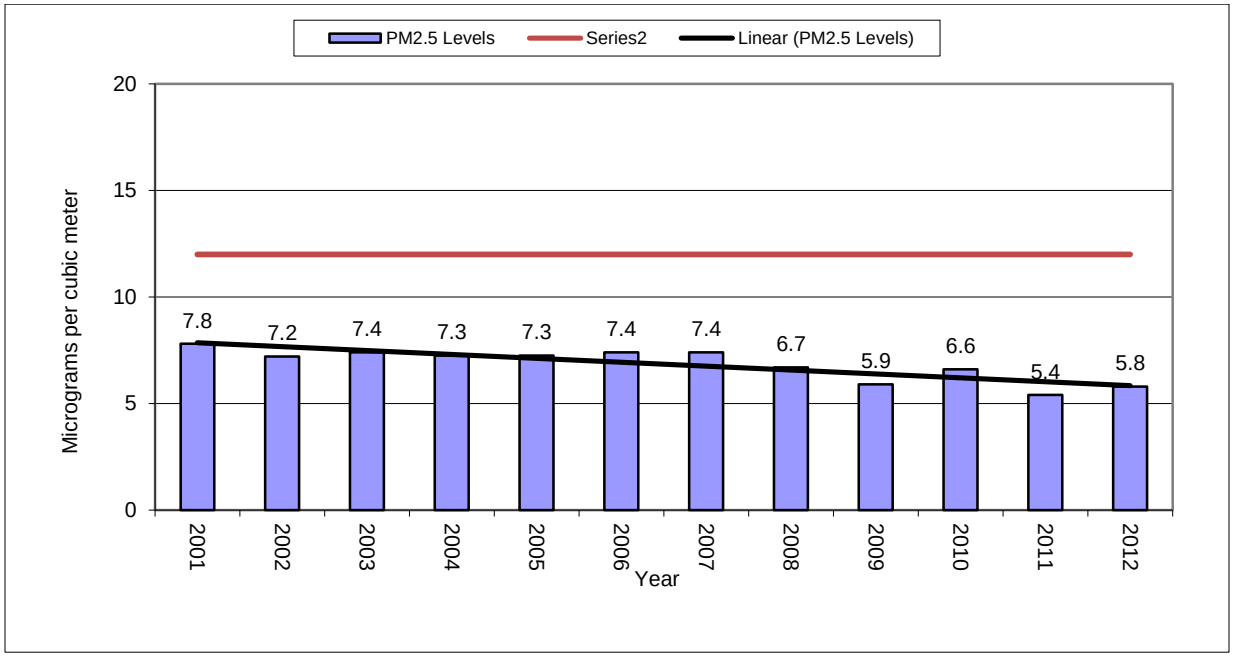
The RC Library Site continues to meet the site purpose of population exposure for PM_{10}. The plan is to continue the PM_{10} monitoring because this is the only site east of the hogback in Rapid City and the site provides a check on PM_{10} levels for fugitive dust controls and as the city of Rapid City adjusts its sanding techniques in eastern Rapid City.

7.1.1.2 RC Library Site – $PM_{2.5}$ Data

The graph in Figure 7-3 shows the $PM_{2.5}$ annual average for each sampling year since 2001. The highest annual average was 7.8 ug/m^3 in 2001 and the lowest was 5.4 ug/m^3 in 2011. The annual average concentrations vary in difference from the highest to lowest annual average by 2.4 ug/m^3. The trend indicates a declining $PM_{2.5}$ concentration level for the past five years with 2011 recording the lowest annual average $PM_{2.5}$ concentration for this site. It appears the $PM_{2.5}$ concentrations are leveling out with the addition of the 2012 data.

The RC Library Site continues to meet the site purpose of population exposure for $PM_{2.5}$. Plans are to continue testing for $PM_{2.5}$ at this site to ensure concentrations do not increase.

Figure 7-3 – RC Library Site $PM_{2.5}$ Annual Averages



7.1.2 RC National Guard Site

The RC National Guard Site is located on the roof of the armory at the Camp Rapid facility in western Rapid City (see Figure 7-4). The site was established at this location in 1992, with PM_{10} the only sampling parameter because a large portion of the particulate matter emissions near this site consists of crustal material. Because the site is located only a few blocks from the high concentration location at the RC Credit Union Site, the PM_{10} monitor is designated as a SPM monitor. The goal of the site is to determine the size of the area being impacted by fugitive dust sources in the quarry area in western Rapid City.

In the spring of 2009 a radiation monitor was added to the site as part of the national RadNet network of sites. The monitor is a SPM monitor that provides a monitoring system to detect levels of radiation from accidental releases or military activities emitting radiation.

Figure 7-4 – RC National Guard Site [1]

[1] – Looking to the southwest.

The sampling objectives for the PM_{10} parameter is to measure population exposure and high concentration resulting from the quarry area north of the monitoring site. In addition, this monitoring site along with the RC Credit Union Site, define the high PM_{10} concentration area in western Rapid City. Table 7-2 contains details on the monitoring site specific to the requirements in 40 CFR Part 58.

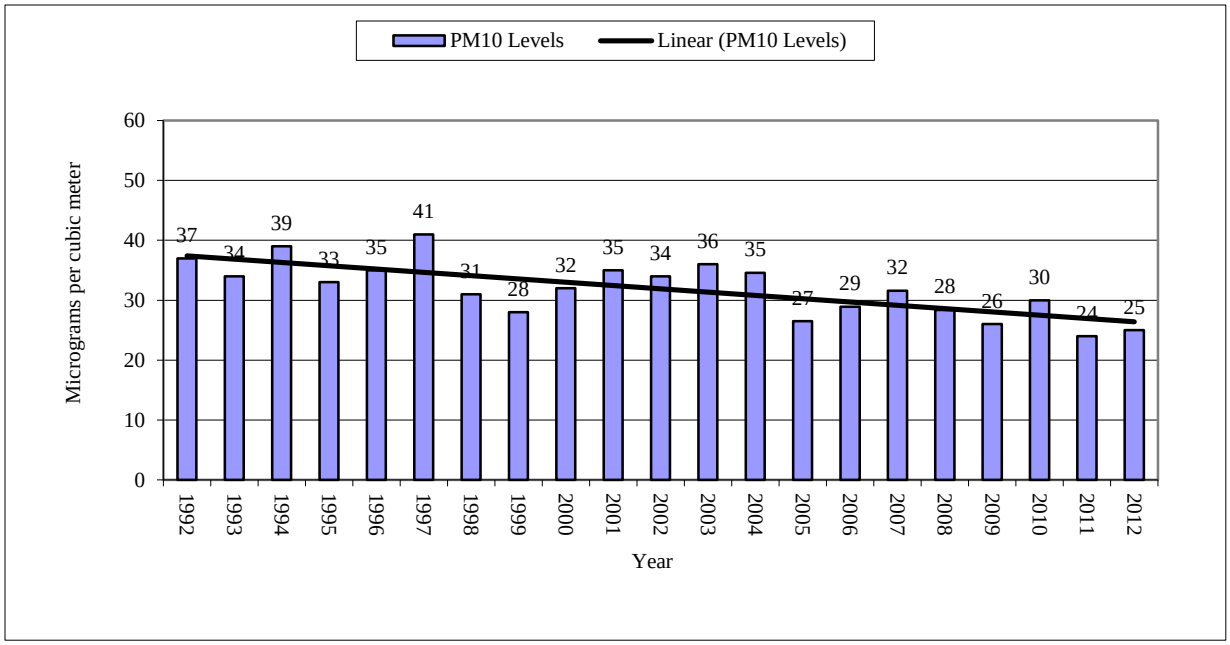
Table 7-2 – RC National Guard Site Specifics

Parameter	Information
Site Name	RC National Guard
AQS ID Number	46-103-0013
Street Address	Camp Rapid Armory West Main Street
Geographic Coordinates	UTM Zone 13, NAD 83, E 638,543.08, N 4,882,373.72
MSA	Rapid City
PM_{10}	(Manual)
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SPMS (No comparison to the NAAQS),

7.1.2.1 RC National Guard Site PM_{10} Data

The RC National Guard Site is the second oldest monitoring location in Rapid City and is a special purpose monitoring site sampling for PM_{10}. The graph in Figure 7-5 shows the annual mean for the site since 1992. The annual means vary from a high of 41 ug/m^3 in 1997 to a low of 24 ug/m^3 in 2011. The trends for the annual mean concentrations continue to decline, but do cycle up and down from year to year.

Figure 7-5 – RC National Guard PM_{10} Annual Averages



The RC Credit Union Site is only four city blocks from the RC National Guard Site. The RC National Guard Site's PM_{10} concentrations continue to be well below the levels recorded at the RC Credit Union Site and the monitors may be shut down since it has demonstrated PM10 emissions from the quarry do not appear to be moving in that direction.

7.1.3 RC Credit Union Site

The RC Credit Union Site is located on a lot next to Fire Station #3 building. The RC Credit Union Site replaced the Fire Station #3 Site in October 2003 and is the high PM_{10} concentration location for the western part of Rapid City. The RC Credit Union Site is located just south of the quarry area and is centrally located in relation to the quarry facilities. Figure 7-6 contains a picture of the monitoring site looking in a northwest direction towards the quarry area. The goal of this site is to determine if the Rapid City area is attaining the PM_{10} standard and population exposure.

Figure 7-6 – RC Credit Union Site [1]

[1] - Looking northwest

Thermo BETA PM_{10}, Met One BAM $PM_{2.5}$, Thermo SO_2 and Thermo NO_2 continuous samplers were operated at this site in 2012. The hourly readings from the continuous PM_{10} monitor are used to assist in the calling of high wind dust alerts for Rapid City and to compare concentrations to the PM_{10} NAAQS. An Andersen PM_{10} Hi-Vol manual monitor is also located at the site to take special samples during high wind dust alerts that can be analyzed to determine potential sources of the dust.

A continuous Met One BAM $PM_{2.5}$ monitor is used to supply hourly data for investigation of high concentration days and to compare to the $PM_{2.5}$ standards. In 2011, continuous SO_2 and NO_2 analyzers were added to the RC Credit Union Site to provide data on population exposure and source oriented testing near the facilities in the quarry area. Table 7-3 contains details on the monitoring site specific to the requirements in 40 CFR Part 58.

Table 7-3 – RC Credit Union Site Specifics

Parameter	Information
Site Name	RC Credit Union
AQS ID Number	46-103-0020
Street Address	106 Kinney Ave.
Geographic Coordinates	UTM Zone 13, NAD 83, E 638,199.75, N 4,882,811.92
MSA	Rapid City
PM_{10}	**(Continuous)**

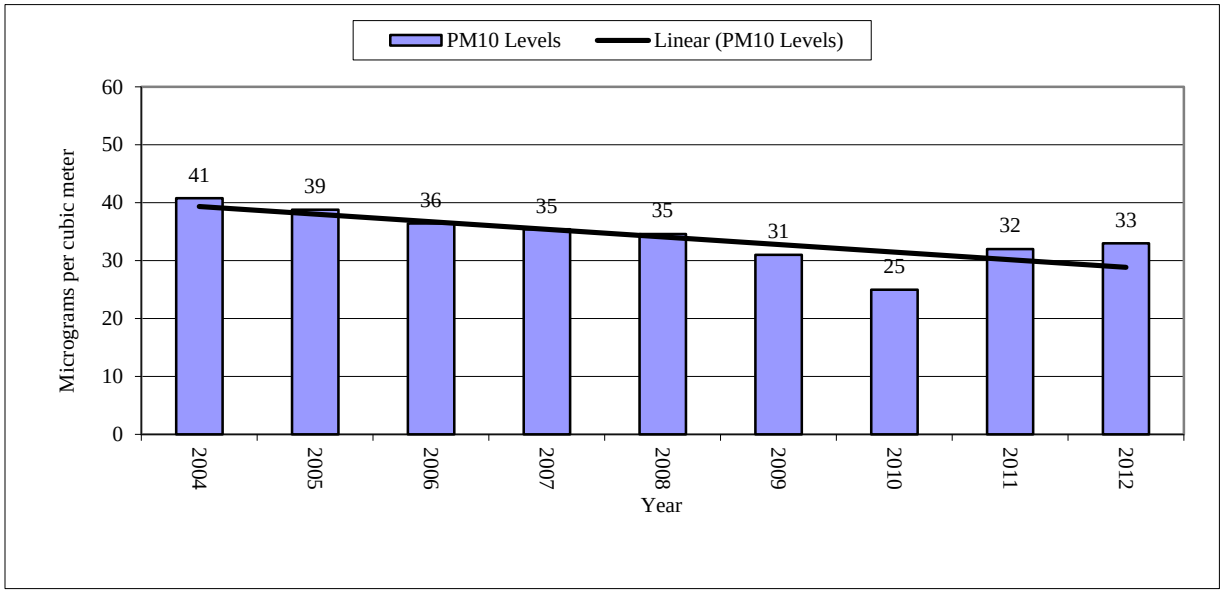
Parameter	Information
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day/co-located FEM to FRM every 12th day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Methods	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) and Real-Time Data
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Special Purpose Schedule
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SPMS (No comparison to the NAAQS),
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0308-170
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Met One BAM-1020
Analysis Methods	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-Time Data
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operation Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Instrumental
Analysis Method	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS) and Real-Time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operation Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Instrumental
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS) and Real-Time Data

7.1.3.1 RC Credit Union Site – PM_{10} Data

The RC Credit Union Site began operation in October 2003. Only three months of data was collected in 2003, so 2004 is the first complete sampling year. Figure 7-7 shows a graph of the

annual average PM_{10} concentration. The PM_{10} annual average concentration for the first seven years shows declining concentration levels each year from 2004 to 2010. In 2011, average concentration levels increased back to the level in 2009. In 2012, average concentration levels increased slightly from 2011 by 1 ug/m^3.

Figure 7-7 – RC Credit Union Site PM_{10} Annual Averages



Testing for PM_{10} concentrations is a priority for this site to ensure the Natural Events Action Plan continues to minimize PM_{10} concentrations during high wind events which is also part of determining public exposure. In addition, the increase of PM_{10} concentrations over the last two years may be a concern. Therefore, the parameter will be continued.

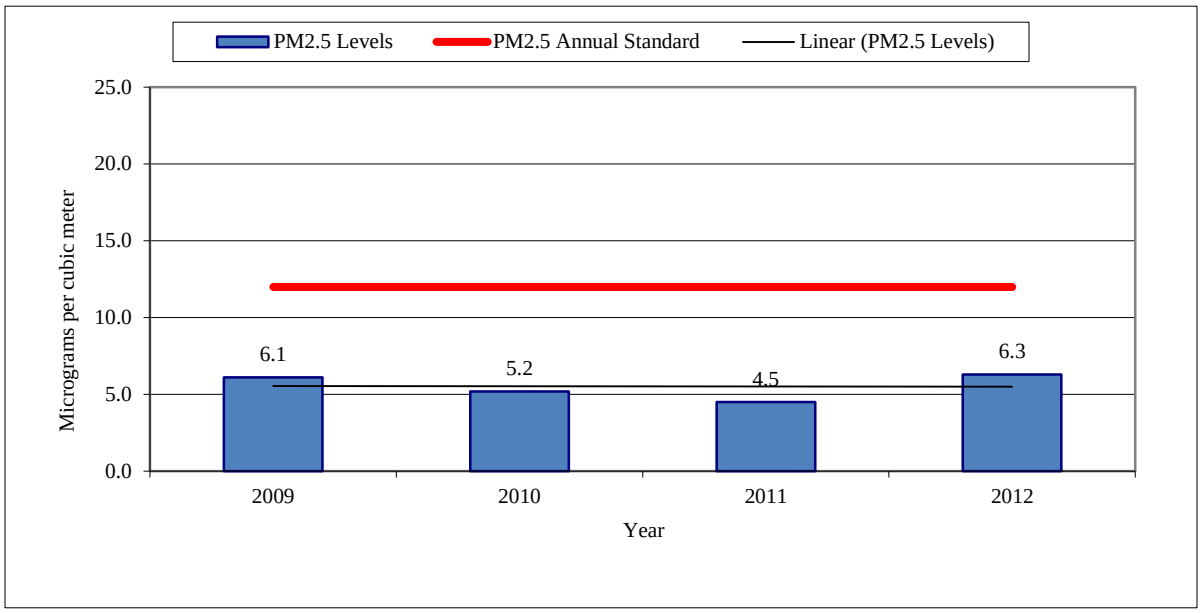
7.1.3.2 RC Credit Union Site $PM_{2.5}$ Data

The testing for $PM_{2.5}$ parameter using the manual method began at this site in October 2003 and completed the first full year of testing in 2004. The RC Credit Union Site records the highest $PM_{2.5}$ concentrations in the Rapid City area for both 24-hour and annual concentrations using the manual FRM monitor.

In 2009, a continuous $PM_{2.5}$ monitor was added to the site as a special purpose monitor. The continuous monitor was a new method and EPA allows the operation of a new monitor as a special purpose monitor for up to three years before the data from the monitor is required to be compared to the $PM_{2.5}$ standard. By the end of 2011 the continuous monitor had operated for three years. As a cost savings change the manual $PM_{2.5}$ monitor was removed and the continuous monitor became the SLAMS monitor providing more data at a lower cost per year of operation.

Figure 7-8 shows the annual average for each sampling year since 2009 when the continuous monitor was setup. In 2011, $PM_{2.5}$ annual concentrations declined to the lowest level since the site began operation with a concentration of 4.5 ug/m^3 for the annual average. The highest annual average for $PM_{2.5}$ at this site was 6.3 ug/m^3 in 2012. Over the four year period, annual concentrations changed by 1.8 ug/m^3. The trends for the four years since the continuous monitor was installed show a steady concentration level.

Figure 7-8 – RC Credit Union Site $PM_{2.5}$ Annual Averages



The parameter of $PM_{2.5}$ will be continued at this site using the continuous monitor to determine compliance with the NAAQS, determine any change in concentration levels, and for public exposure.

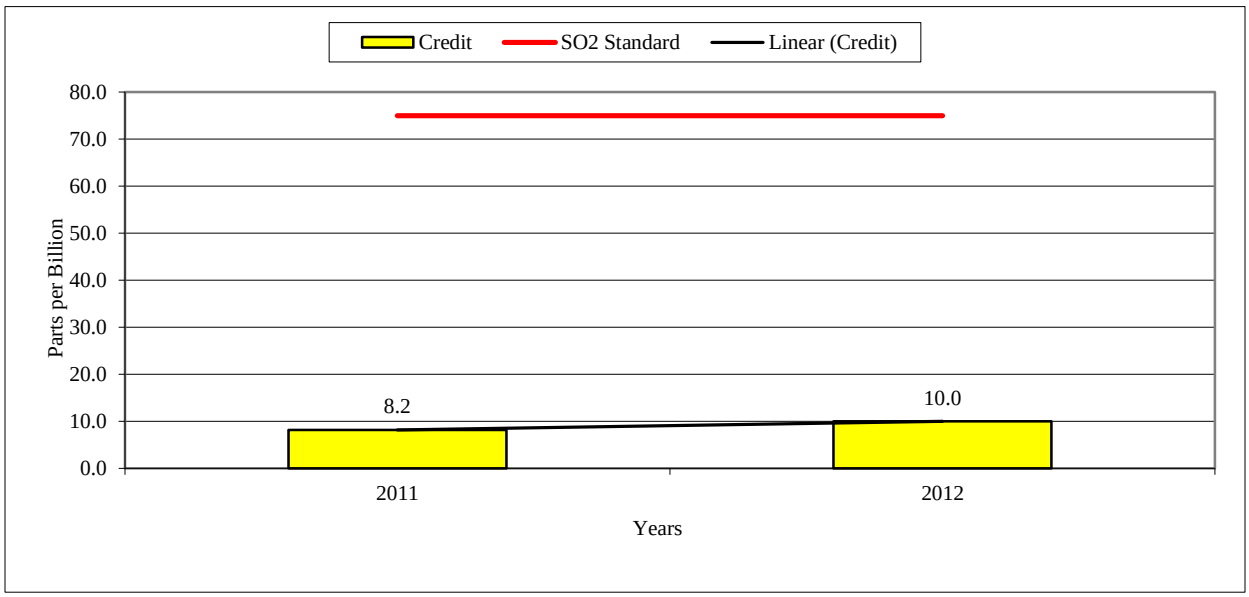
7.1.3.3 RC Credit Union Site Sulfur Dioxide Data

Testing for sulfur dioxide started at the beginning of 2011 for this site. Some testing for the parameters was done in the 1990s but that data is old and there is need for the collection of new data. The annual standard for sulfur dioxide was dropped when the standard was revised so the 1-hour 99 percentile concentrations will be used to track trends.

See Figure 7-9 for the concentration of sulfur dioxide recorded at the RC Credit Union Site. The concentration is low at only 11% of the standard.

Testing for sulfur dioxide will continue at this site until at least three years of data is collected at which time the department will determine if monitoring should continue at this site.

Figure 7-9 –RC Credit Union Site Sulfur Dioxide 99th Percentile 1-hour Averages



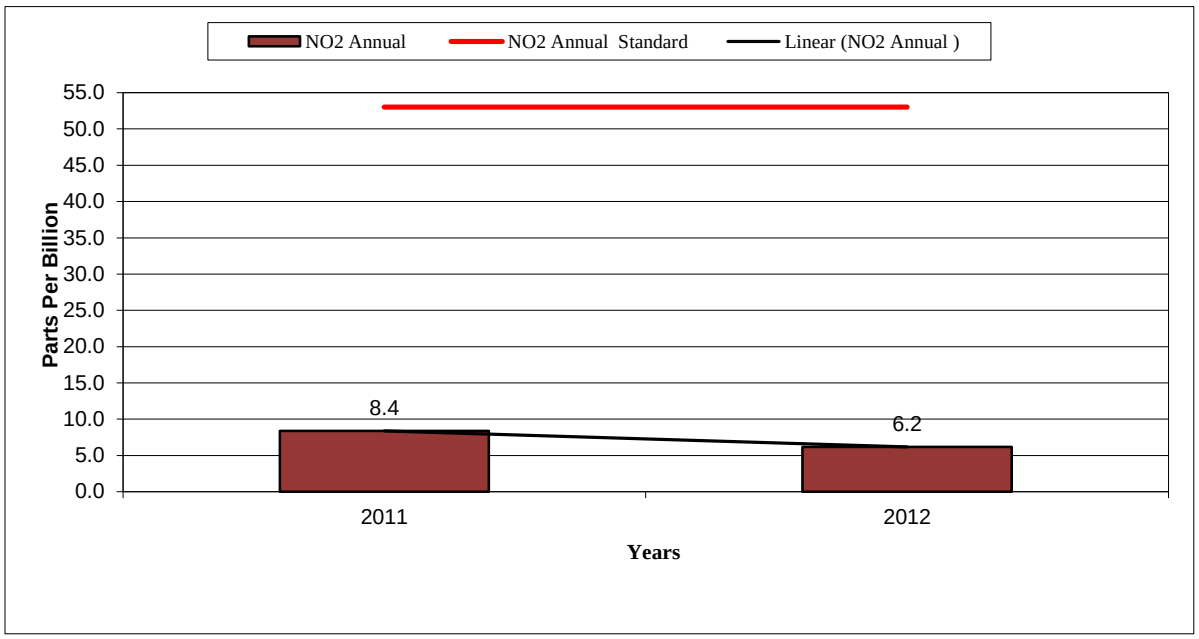
7.1.3.4 RC Credit Union Site Nitrogen Dioxide Data

Testing for nitrogen dioxide started at the beginning of 2011 for this site. Some testing for the parameters was done in the 1990s but that data is old and there is need for the collection of new data. The nitrogen dioxide standard includes a 1-hour and annual average concentrations so the annual will be represented to track trends.

See Figure 7-10 for concentrations of nitrogen dioxide at the RC Credit Union Site. The concentrations are low at only 14% of the standard.

Testing for nitrogen dioxide will continue at this site until at least three years of data is collected at which time the department will determine if monitoring should continue at this site.

Figure 7-10 – RC Credit Union Site Nitrogen Dioxide Annual Averages



7.2 Black Hawk Site

Black Hawk is a small town located just north of Rapid City in Meade County north of the quarry area. Black Hawk is not an incorporated city but is a growing subdivision and is part of the Rapid City MSA. The goal of the Black Hawk Site is to determine urban background concentrations for PM_{10} coming into the Rapid City area from the north and determine compliance with the ozone NAAQS in the Rapid City MSA.

The Black Hawk Site was setup in the fall of 2000. The site is located on a small hill east of the Black Hawk Elementary School. PM_{10} and $PM_{2.5}$ monitors were located on a sampling shelter until October 2003 when the sampling shelter was moved to the RC Credit Union Site. The monitors were then located on scaffolding within a fenced area until the fall of 2006 when a shelter was added back to the site.

At the end of 2004 the $PM_{2.5}$ monitors were removed because concentrations were the lowest in the area and the potential for concentrations over the NAAQS were very low. In 2007, the ozone analyzer was moved from RC Credit Union Site to the Black Hawk Site to operate the ozone parameter outside of the modeled one microgram nitrogen dioxide influence area from air quality sources in western Rapid City. See Figure 7-11 for a current picture of the site looking to the northwest.

Figure 7-11 – Black Hawk Site [1]

[1] – Looking west.

The land use around the site is mainly residential with a few service type businesses. There are no obstructions around the monitoring site. The limestone quarry industries are located to the south and southeast of the Black Hawk Site and are expanding to ore bodies located closer to this site. The closest new limestone quarry is currently operating about 1.5 miles south of the site.

The site's spatial scale is neighborhood for PM_{10} and ozone sampling. The objectives of the PM_{10} sampling are high concentration, population, and source impact. The objectives of the ozone sampling are high concentration and population. Table 7-4 contains details on the monitoring site specific to the requirements in 40 CFR Part 58.

Table 7-4 – Black Hawk Site Specifics

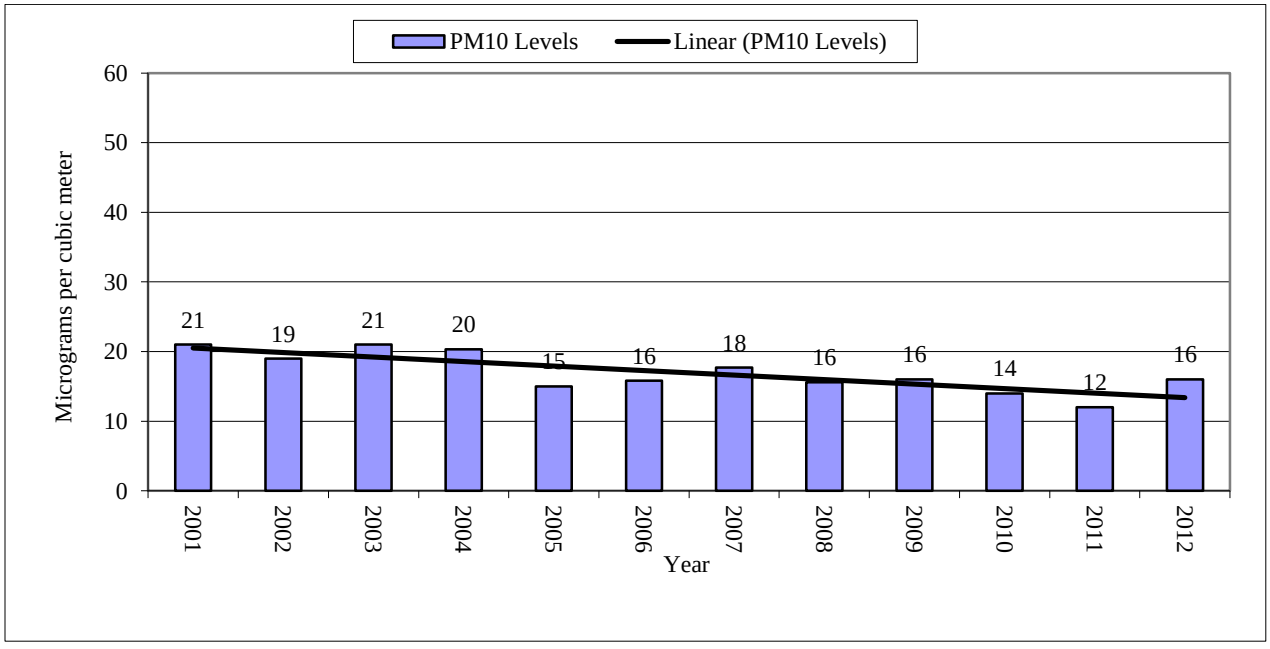
Parameter	Information
Site Name	Black Hawk Elementary
AQS ID Number	46-093-0001
Street Address	7108 Seeaire Street
Geographic Coordinates	UTM Zone 13, NAD 83, E 634,683.07 N 4,890,309.65
MSA	Rapid City
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063
Operating Schedule	Every Sixth Day
Scale Representation	Neighborhood

Parameter	Information
Monitoring Objective	Population, Urban Background
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-147
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Instrumental Thermo 49i
Analysis Methods	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS) and Real-time Data

7.2.1 Black Hawk Site PM_{10} Data

Figure 7-12 contains a graph showing the PM_{10} annual averages for the Black Hawk Site. The first four years of PM_{10} concentration levels remained about the same. In 2005, the annual average dropped by approximately 5 ug/m^3 from the 2004 level. The highest annual average was 21 ug/m^3 recorded in both 2001 and 2003. The lowest level of 12 ug/m^3 was recorded in 2011. In 2012, the PM_{10} concentrations increased by 4 ug/m^3 from the concentration in 2011. The overall trend shows a significant decrease in concentrations over the twelve year period. The last eight years has fluctuated up and down with a low of 12 ug/m^3 and a high of 18 ug/m^3.

Figure 7-12 – Black Hawk Site PM10 Annual Averages

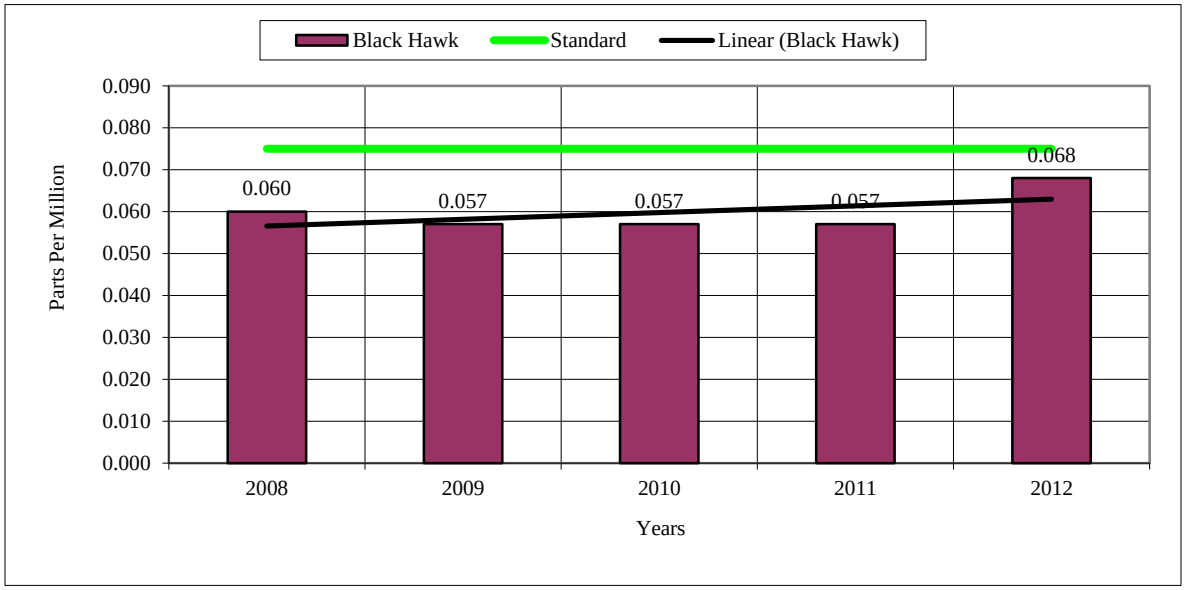


The site continues to represent high concentration and public exposure for PM_{10}. The department will continue to operate at this site to determine if there are any changes in concentrations as the limestone quarry operations move closer to Black Hawk.

7.2.2 Black Hawk Site Ozone Data

The 2012 sampling year is the fifth ozone season at the Black Hawk Site (see Figure 7-13). In the first year of testing (2008), the site recorded the second highest ozone level in the state. In 2012, the ozone levels were up statewide by 4 ppb and significantly at this site by 11 ppb.

Figure 7-13 – Black Hawk Site Ozone Yearly 4th Highest 8-hour Averages



The site continues to represent high concentration and public exposure for ozone. The testing results show the area is attaining the ozone standard; but is within 90% of the standard. Therefore, the department will continue to test for ozone at this location.

7.3 Badlands Site

The Badlands Site is one of two Class I areas in South Dakota designated for visibility protection under the Clean Air Act. The Badlands area is a large national park that attracts more than two million visitors each year. The Badlands area is a dry semi-desert area with short prairie grass and beautiful sandstone cliff vistas.

The Badlands Site was established in 2000, with manual monitors for PM_{10} and $PM_{2.5}$. The site is located next to the IMPROVE site which also included an ozone analyzer operated by the National Park Service. The site is in the southeast part of the park near the visitor center. Figure 7-14 shows a current picture of the Badlands Site.

In October of 2004, the number of pollutant parameters was increased by adding continuous monitors for PM_{10}, $PM_{2.5}$, sulfur dioxide, and nitrogen dioxide. The changes increased the amount of data collected and provide additional information on transport of air pollution. At the end of 2007, the department took over the operation of the ozone monitor at this site at the request of the National Park Service.

Figure 7-14 –Badlands Site [1]

[1] – Looking northeast

The IMPROVE data is used to determine what type of sources are impacting the visibility of the national parks in South Dakota. The goal of having a SLAMS site next to the IMPROVE site is to determine how the data compares between the two different sampling methods, to determine air pollution background levels, and to see if pollution trends show long range transport of air pollution into the state. Table 7-5 contains details on the monitoring site specific to the requirements in 40 CFR Part 58.

Table 7-5 – Badlands Site Specifics

Parameter	Information
Site Name	Badlands
AQS ID Number	46-071-0001
Street Address	25216 Ben Reifel Road, Interior, South Dakota 57750
Geographic Coordinates	UTM Zone 14, NAD 83, E 263,173.81 N 4,847,799.95

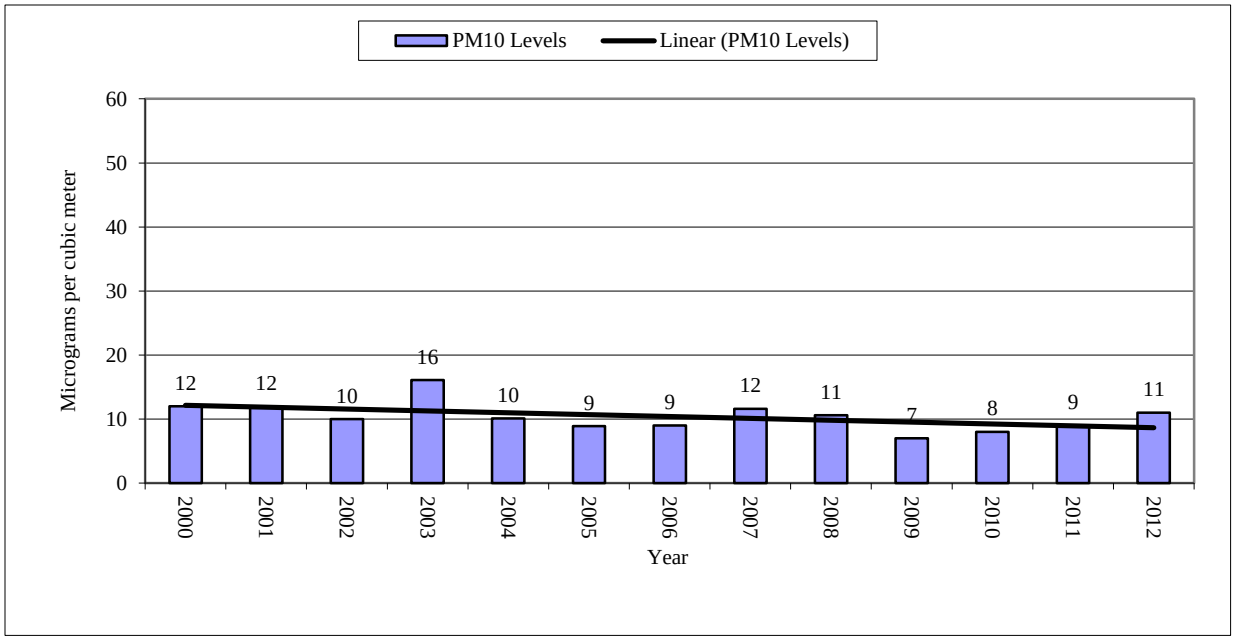
Parameter	Information
MSA	None
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0308-170
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SLAMS (Comparison to the NAAQS)
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS) and Real-time Data

7.3.1 Badlands Site – PM_{10} Data

PM_{10} data has been collected at this site since 2000. The PM_{10} manual monitor was operated on an every sixth day schedule through 2004. Beginning in 2005, a continuous Thermo Beta Gauge PM_{10} monitor replaced the manual monitors.

Figure 7-15 contains a graph of the annual averages for the Badlands Site. The trend line shows a declining concentration level. The annual average concentration over the last nine years varied slightly overall; but has been increasing for the last four years. The highest annual average concentration of 16 ug/m^3 was recorded in 2003. The lowest annual average concentration of 7 ug/m^3 was recorded in 2009. The PM_{10} concentrations recorded at this site are some of the lowest levels in the state and are considered background for the western half of the state.

Figure 7-15 – Badlands Site – PM10 Annual Averages



This parameter is meeting the goals for testing at this site and will be continued to measure long range transport into western South Dakota.

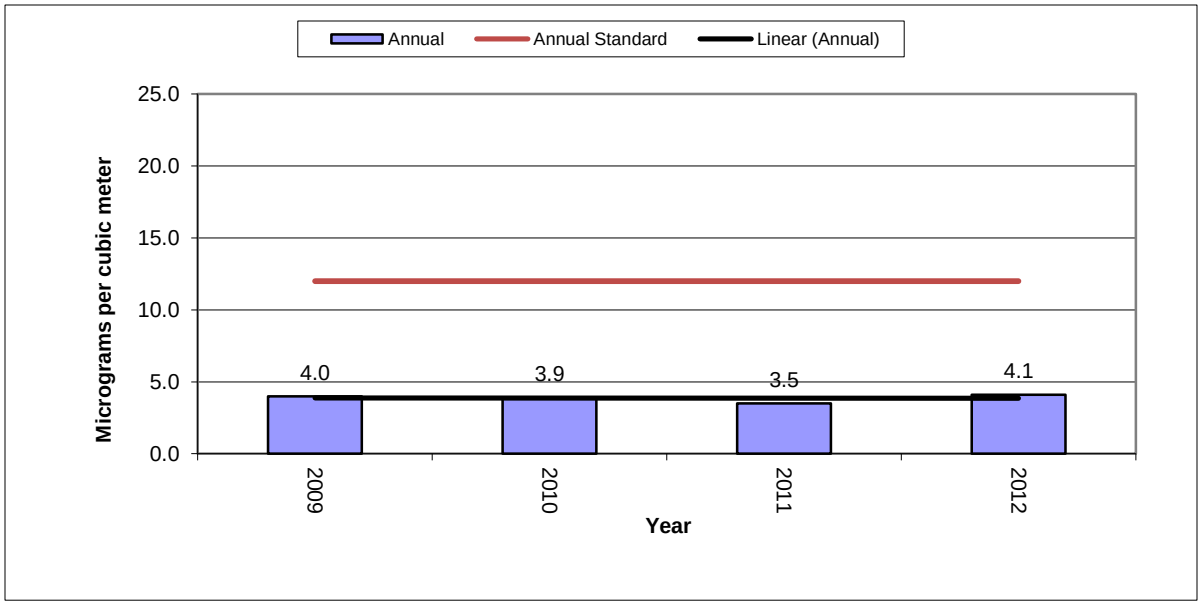
7.3.2 Badlands Site – $PM_{2.5}$ Data

The $PM_{2.5}$ monitors run on an every third day schedule from 2001 to 2008. Beginning in 2009, the Met One BAM-1020 FEM continuous monitor replaced the manual RAAS 100 and the sampling schedule went to every day providing hourly and 24-hour average concentrations.

Figure 7-16 contains a graph of the annual averages. The annual averages for the Badlands Site show a concentration range with a high of 4.1 ug/m^3 in 2012 and a low of 3.5 ug/m^3 in 2011.

The trend for the annual average is a steady concentration level. $PM_{2.5}$ concentrations at this site are the lowest in the state and represent background levels for western South Dakota.

Figure 7-16 – Badlands Site PM2.5 Annual Averages



This parameter is meeting the goals for testing at this site and will be continued to measure long range transport into western South Dakota.

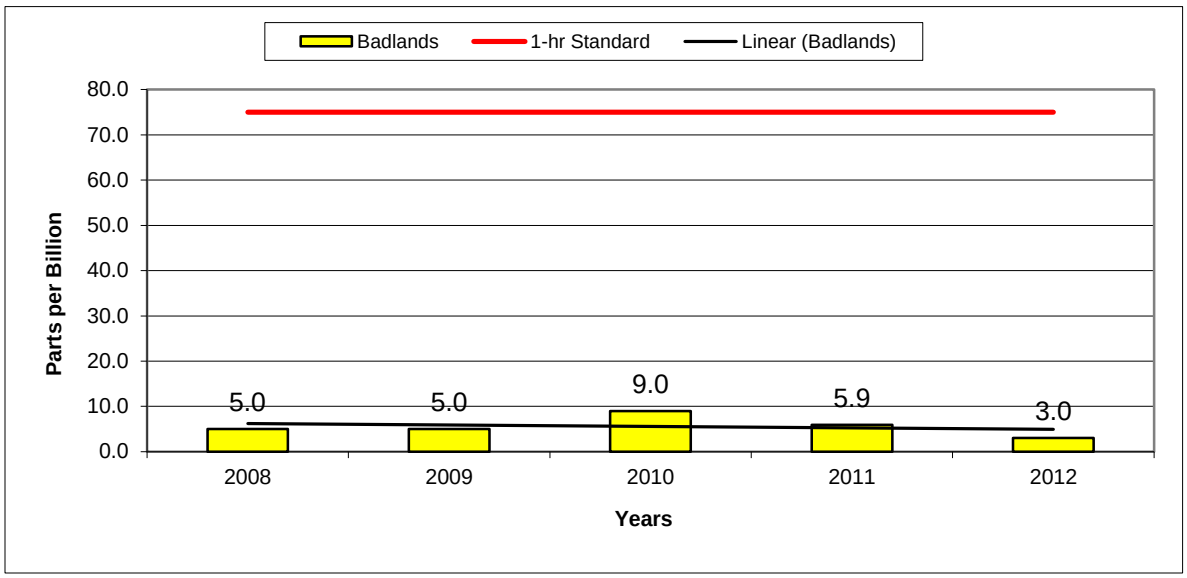
7.3.3 Badlands Site - Sulfur Dioxide Data

The first year of testing at the Badlands Site for sulfur dioxide occurred in 2005. As expected, concentrations for sulfur dioxide are very low and represent background levels.

See Figure 7-17 to view a graph of the annual average concentrations for sulfur dioxide. In 2012, the annual average was down slightly from 2011 from 5.9 ppb to 3.0 ppb of sulfur dioxide and represents the lowest annual average for the five years of monitoring. The linear trends line shows a slight decrease in concentrations but levels are very low and indicate minimal concentrations of sulfur dioxide.

This parameter is meeting the goals for testing at this site and will be continued to measure long range transport into western South Dakota.

Figure 7-17 – Badlands Site Sulfur Dioxide 99th Percentile 1-hour Average



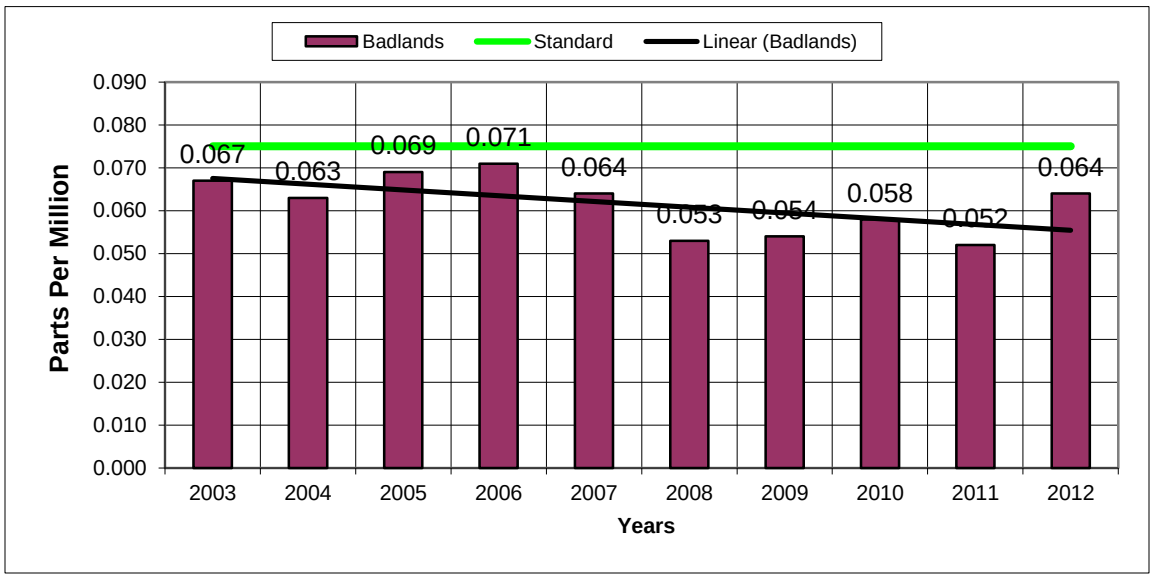
7.3.4 Badlands Site – Ozone Data

The first year of testing at the Badlands Site for ozone was in 2003, with equipment being operated by the National Park Service. The department completed quarterly audits of the ozone analyzer so data could be compared to the NAAQS. At the beginning of 2008 sampling year, the department took over the operation of the ozone analyzer.

See Figure 7-18 to view a graph of the yearly 4th highest 8-hour average. Concentrations of ozone at this site have varied over the ten years of testing. The yearly 4th highest 8-hour average ranged from a high of 0.071 in 2006 to a low of 0.052 in 2011. The linear trends line shows a declining concentration level starting in 2007 but shows an increase in concentrations in 2012. This trend is similar to most of the sites in the western part of the state with lower ozone levels since 2006 and concentrations up in 2012.

This parameter continues to be a priority at this location because of past concentration levels and testing will be continued to measure long range transport into western South Dakota.

Figure 7-18 – Badlands Site Ozone Yearly 4th Highest 8-hour Averages

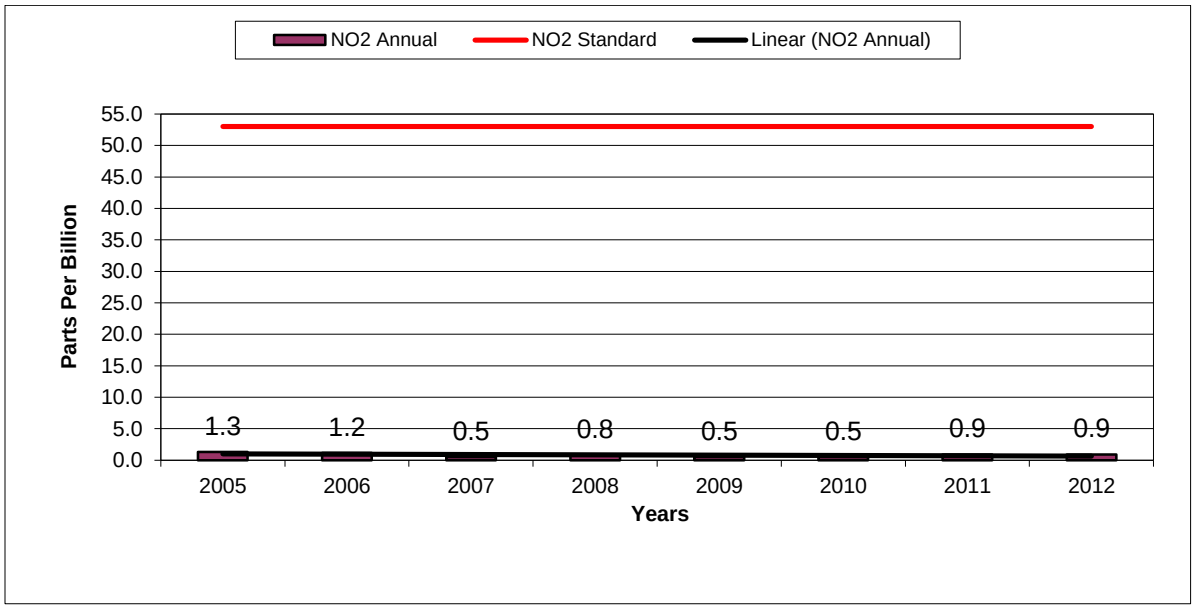


7.3.5 Badlands Site – Nitrogen Dioxide Data

The first year of testing at the Badlands Site for nitrogen dioxide occurred in 2005. As expected, concentrations for nitrogen dioxide are very low and represent background levels.

See Figure 7-19 to view a graph of the annual average concentrations. The linear trends line shows a stable concentration level.

Figure 7-19 – Badlands Site – Nitrogen Dioxide Annual Averages



This parameter continues to be a priority at this location because of past concentration levels and testing will be continued to measure long range transport into western South Dakota.

7.4 Wind Cave Site

The Wind Cave National Park is one of two Class I areas in South Dakota designated for visibility protection under the Clean Air Act. The Wind Cave area is a large national park located in the southern Black Hills of South Dakota. The Wind Cave Site was established in 2005, with manual monitors for $PM_{2.5}$ and continuous monitors for $PM_{2.5}$, PM_{10}, sulfur dioxide, nitrogen dioxide, and ozone. At the end of 2010, the manual $PM_{2.5}$ monitors were removed from the site leaving only the continuous $PM_{2.5}$ monitor for this parameter.

The monitoring equipment is located in a sampling shelter next to the IMPROVE site operated by the National Park Service. The site is located a short distance west of the visitor center. Figure 7-20 shows a current picture of the Wind Cave Site.

Figure 7-20 – Wind Cave Site [1]

[1] – Looking west

The IMPROVE data is used to determine what type of sources are impacting the visibility of the national parks in South Dakota. The purpose of having a SLAMS site next to the IMPROVE site is to determine how the data compares between the two different sampling methods, to determine air pollution background levels, and to see if pollution trends show long range transport of air

pollution from outside of the state. Table 7-6 contains details on the monitoring site specific to the requirements in 40 CFR Part 58.

Table 7-6 – Wind Cave Site Specifics

Parameter	Information
Site Name	Wind Cave
AQS ID Number	46-033-0132
Street Address	290 Elk Mountain Camp Road, Hot Springs, South Dakota
Geographic Coordinates	UTM Zone 13, NAD 83, E 622,471.56 N 4,823,856.93
MSA	None
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0308-170
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 FEM
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SPMS
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental
Analysis Method	Ultra Violet
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data

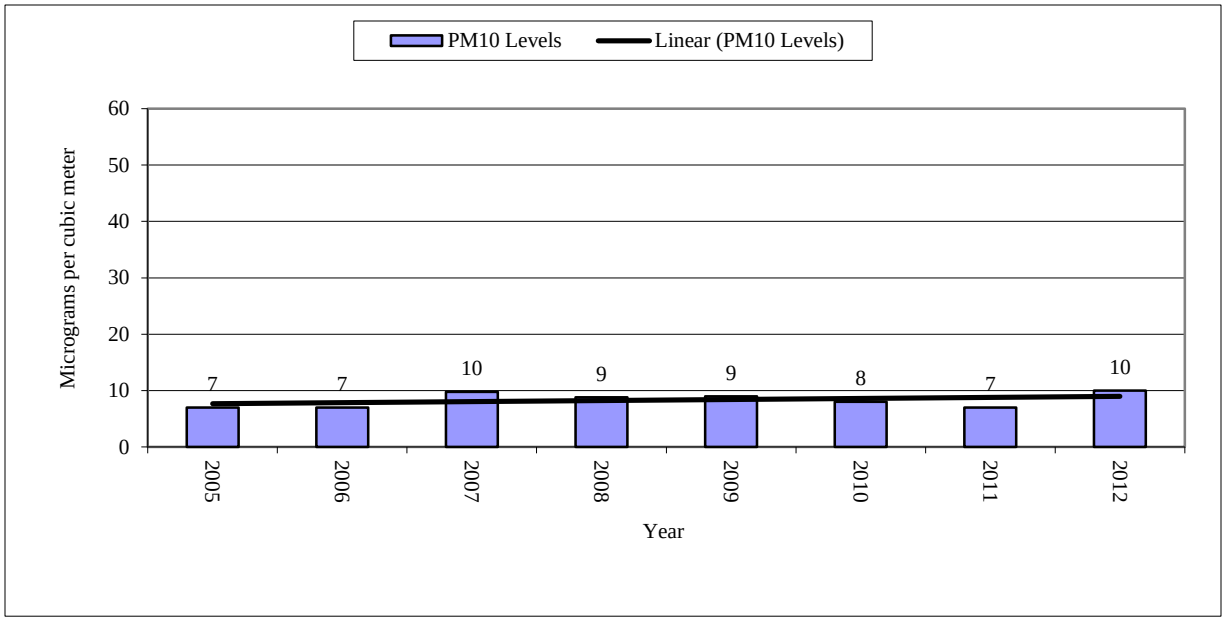
7.4.1 Wind Cave Site – PM_{10} Data

The PM_{10} concentrations at this site are one of the lowest in the state and are similar in concentrations as the Badlands Site. The Wind Cave Site is the most remote site in the state and a site that has no influence from industry and agriculture activities near the location.

Figure 7-21 contains a graph showing the annual average PM_{10} concentrations. The 2012, PM_{10} concentrations were up slightly from 2011 and match the highest PM_{10} concentrations measured at the site. The trend line indicates a steady to a slightly increasing concentration level over the

eight years of testing. The concentrations ranged from 7 to 10 ug/m^3 and are very low representing background levels.

Figure 7-21 - Wind Cave Site PM10 Annual Averages

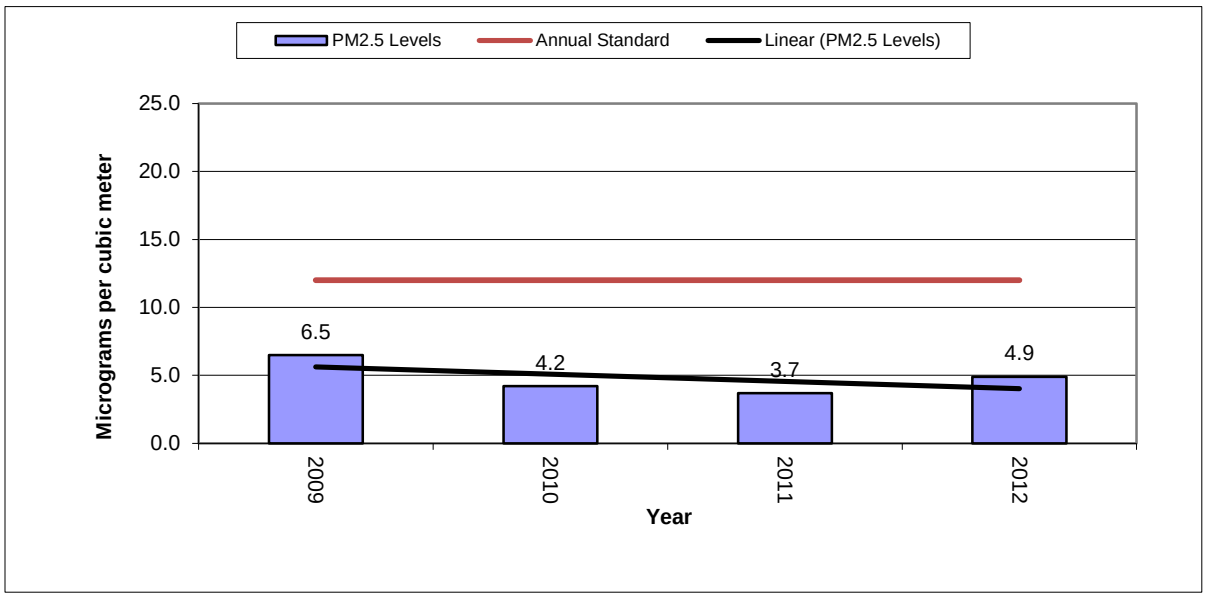


This parameter is meeting the goals of background, visibility protection, long range transport, and will be continued.

7.4.2 Wind Cave Site – PM 2.5 Data

The $PM_{2.5}$ concentrations are similar to the levels recorded at the Badlands Site and are some of the lowest in the state. Figure 7-22 contains a graph showing the annual average $PM_{2.5}$ concentration levels. The $PM_{2.5}$ annual average concentration range from 6.5 ug/m^3 in 2009 to 3.7 ug/m^3 in 2011. Concentrations were up slightly in 2012 from 2011 but still very low. The linear trend line indicates a decrease in concentration level during the four years of testing mainly because the first year of sampling was the highest concentration. The last three years of monitoring is steady with a slight increase in 2012.

Figure 7-22 Wind Cave Site PM2.5 Annual Averages



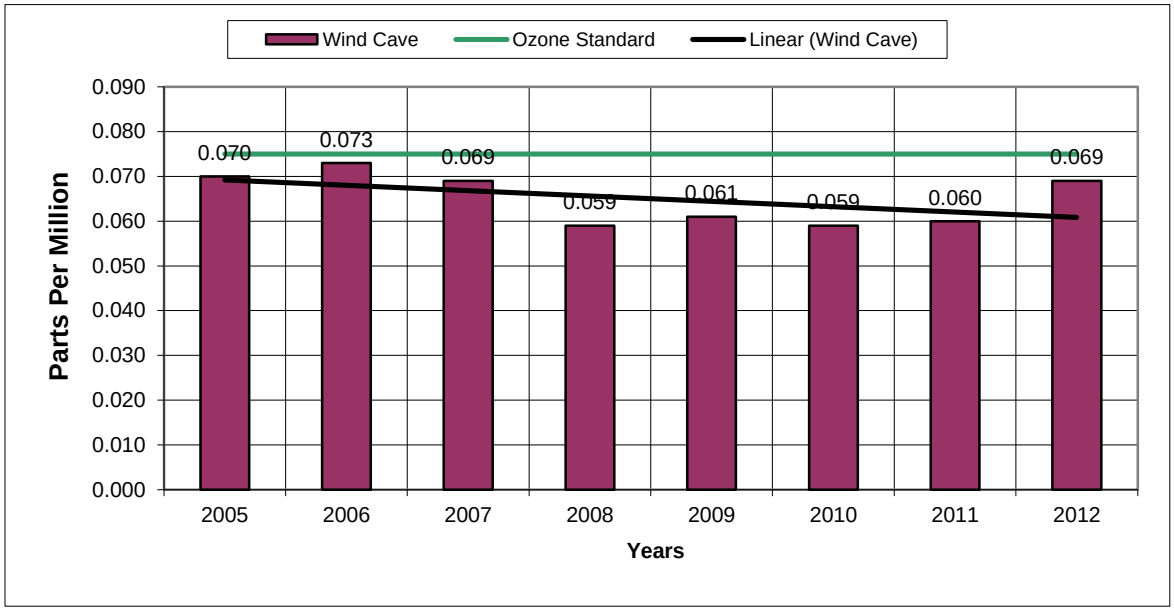
This parameter is meeting the goals of background, visibility protection, and long range transport and will be continued.

7.4.3 Wind Cave Site – Ozone Data

Figure 7-23 contains a graph of the ozone 8-hour concentrations for the Wind Cave Site since 2005. The Wind Cave Site had the highest reported yearly 4th highest 8-hour ozone level in the state at 0.073 parts per million recorded in 2006. Ozone levels began to fall in 2007 and the trend line shows deceasing concentrations until 2012. In 2012, like all of the other sites, Wind Cave ozone levels increased significantly.

Testing for ozone is meeting the needs of the monitoring network by detecting transport pollution levels for this area of the state. Therefore, this parameter will be continued.

Figure 7-23 – Wind Cave Ozone Yearly 4th Highest 8-hour Averages



7.5 Sioux Falls Area

In 2012, two sampling sites were operated in the Sioux Falls area: 1) KELO and 2) SD School sites. The criteria pollutant parameters tested at these sites include PM_{10}, $PM_{2.5}$, ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide. In addition, special purpose monitoring parameters includes $PM_{2.5}$, $PM_{10\text{-}2.5}$, $PM_{2.5}$ speciation, NO_y and air toxics.

The city continues to grow and now includes residential areas in two counties: 1) Minnehaha and 2) Lincoln. Sioux Falls is the largest city in the state with a 2010 Census population of 169,468 for Minnehaha County and 44,828 in Lincoln County. The industrial base is mainly service oriented businesses with some heavy industry.

7.4.1 KELO Site

The KELO Site was established in 1991, as a replacement for the City Hall Site and monitored for PM_{10}. The site is located in the downtown, central part of the city and at 22 years of operation is the oldest site still operating in Sioux Falls. Sampling for $PM_{2.5}$ concentrations began in 2001. At the end of 2010, the PM_{10} parameter was removed from this site because concentrations were low and has a very small chance of exceeding the national standard. Figure 7-24 shows a current picture of the monitoring site.

Figure 7-24 – KELO Site [1]

[1] – Looking north

During an oversight review completed by EPA in 2001, it was noted a tree planted to the west of the sampling site had grown and would require the sampling platform be moved about 10 feet east. The monitors were moved so the tree would not be an obstruction of the 360-degree arch around the monitor. In 2012, the distance between the monitors and the tree was checked and is sufficient so the tree is not an obstruction to the site. The height of the tree is assessed each year to be sure the distance of the monitors from the tree meets the location requirements in 40 CFR Part 58.

In 2002, a $PM_{2.5}$ speciation monitor was added to the site to determine the chemical makeup of the $PM_{2.5}$ pollution. The sampler was located at this site because the $PM_{2.5}$ concentrations are some of the highest in the state and because the city of Sioux Falls is the largest population center in the state. In 2009, the $PM_{2.5}$ speciation monitor was moved from this site to the SD School Site which is the NCore Site for South Dakota. The move was required by EPA's rules.

Table 7-7 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

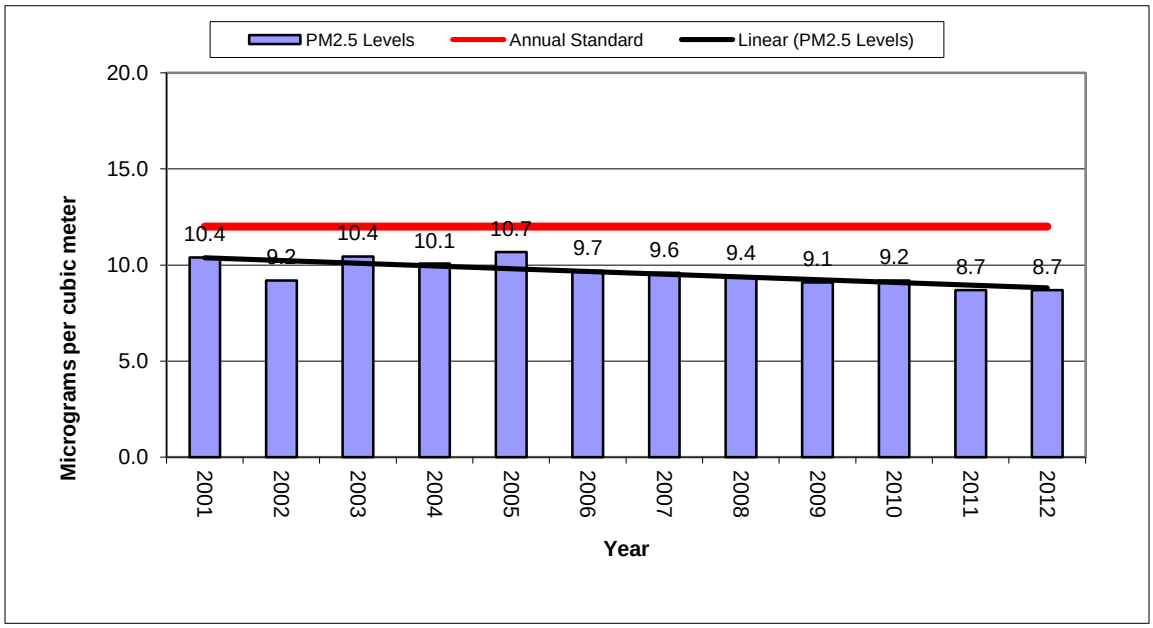
Table 7-7 - KELO Site Specifics

Parameter	Information
Site Name	KELO
AQS ID Number	46-099-0006
Street Address	500 South Phillips, Sioux Falls, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 683,678.21 N 4,823,550.80
MSA	Sioux Falls
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0202-143
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Partisol 2000 $PM_{2.5}$ w/VSCC
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.4.1.1 KELO Site – $PM_{2.5}$ Data

Figure 7-25 contains a graph of the annual averages for the KELO Site. Annual averages for the KELO Site have a range from a high of 10.7 ug/m^3 in 2005 to a low of 8.7 ug/m^3 in 2011 and 2012. Annual averages show some variation from year to year, but the trend line shows a slight decrease in concentration.

Figure 7-25 – KELO Site PM2.5 Annual Averages



The KELO Site is one the highest $PM_{2.5}$ concentration sites in the state for 24-hour and annual concentrations. Some years it has the highest 24-hour or annual level in the state. In 2012,

$PM_{2.5}$ concentrations were the third highest out of 11 sites but all sites located along the eastern edge of the state were very close in levels.

This parameter is meeting the monitoring objective of population and high concentration. Because it represents one of the highest $PM_{2.5}$ concentration sites in the state, this site continues to be an important site and testing will be continued at this time.

7.4.2 SD School Site

The SD School Site replaced the SF Hilltop Site on January 1, 2008. The site is the National Core (NCore) site for the state. In 2012, sampling parameters at the SD School Site included PM_{10}, $PM_{2.5}$, ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, NO_y, $PM_{10-2.5}$, meteorology, $PM_{2.5}$ speciation and air toxics. The setup of sampling equipment for $PM_{10-2.5}$ includes results for PM_{10} and $PM_{2.5}$ without adding any additional monitors to the site. This is a very busy monitoring site collecting more than 110,000 data points per year all loaded to the EPA national database. Figure 7-28 shows a current picture of the SD School Site.

Figure 7-26 – SD School Site [1]

[1] – Looking northeast

The SD School Site is located on the east central part of the city. The site is about 1.2 miles southeast of the main industrial area in Sioux Falls. The area around the site is mainly residential. Interstate 229 which is a major commuting road runs north and south about three city blocks east of the monitoring site.

Table 7-8 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use. In addition to the parameters listed in Table 7-8, an air toxic monitor samples every sixth day and $PM_{2.5}$ speciation monitor is operated at an every 3rd day sampling schedule.

Table 7-8 – SD School Site Specifics

Parameter	Information
Site Name	SD School
AQS ID Number	46-099-0008
Street Address	2009 East 8th Street, Sioux Falls, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 687,288.70 N 4,822,930.29
MSA	Sioux Falls
PM_{10}/PM_{coarse}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0798-122
Operating Schedule	Every Daily/Hourly
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Met One BAM-1020
Analysis Methods	beta attenuation
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Reference Method RFPS-0202-143
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Partisol 2000 w/VSCC
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-0308-170
Operating Schedule	Every Daily/Hourly
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Met One BAM-1020
Analysis Methods	beta attenuation
Data Use	SLAMS (Comparison to the NAAQS)
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Instrumental Thermo 49C

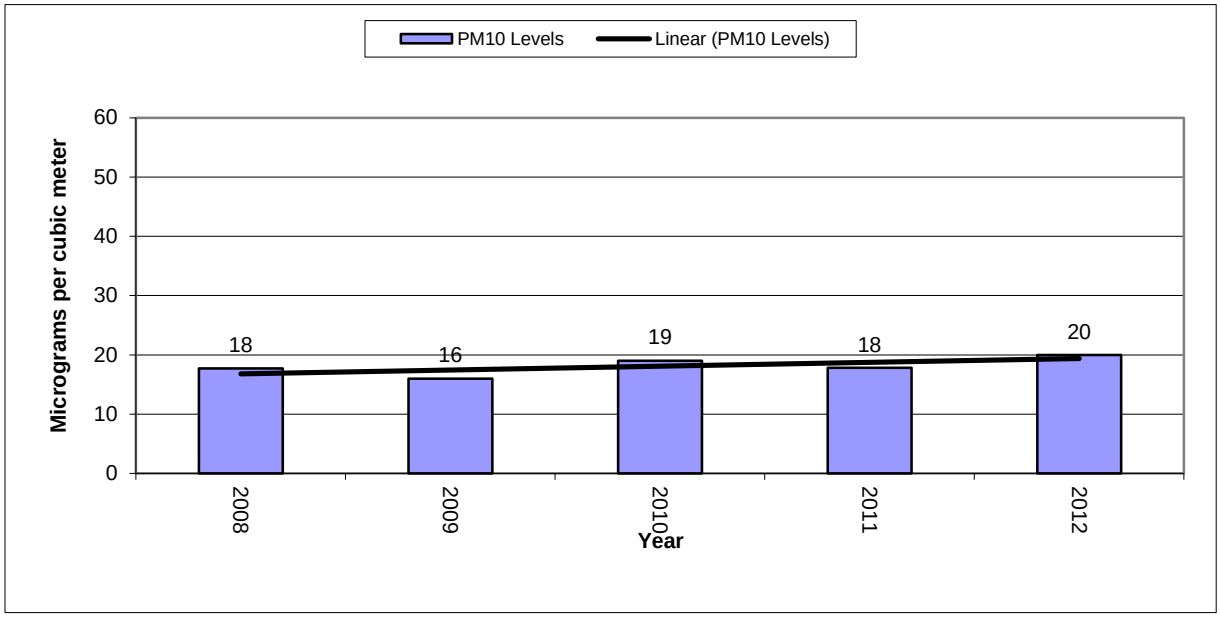
Parameter	Information
Analysis Methods	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Automated Analyzer Thermo 42c
Analysis Methods	Ultraviolet Fluorescence
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data
NO_y	**(Continuous)**
Sampler Type	None
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	Population
Sampling Method	Automated Analyzer Thermo 42i
Analysis Methods	Chemiluminescence NO-Dif-NO_y
Data Use	SPMs
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Instrumental Thermo 43i TL
Analysis Methods	Pulsed Fluorescence
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data
CO	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Hourly
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Instrumental Thermo 48i TLE
Analysis Methods	Gas/Filter/Correlation
Data Use	SLAMS (Comparison to the NAAQS), Real-time Data

7.4.2.1 SD School Site – PM_{10} Data

Figure 7-27 shows a graph of the annual averages since 2008. The annual averages at the SD School Site range from a high of 20 ug/m^3 in 2012 to a low of 16 ug/m^3 in 2009. In 2012, PM_{10} concentrations were slightly higher than the previous year. The trend line indicates a slightly increasing concentration level.

This parameter is meeting the monitoring objective of population and high concentration. This parameter will be continued because it is a requirement at a NCore site.

Figure 7-27 – SD School Site PM10 Annual Averages

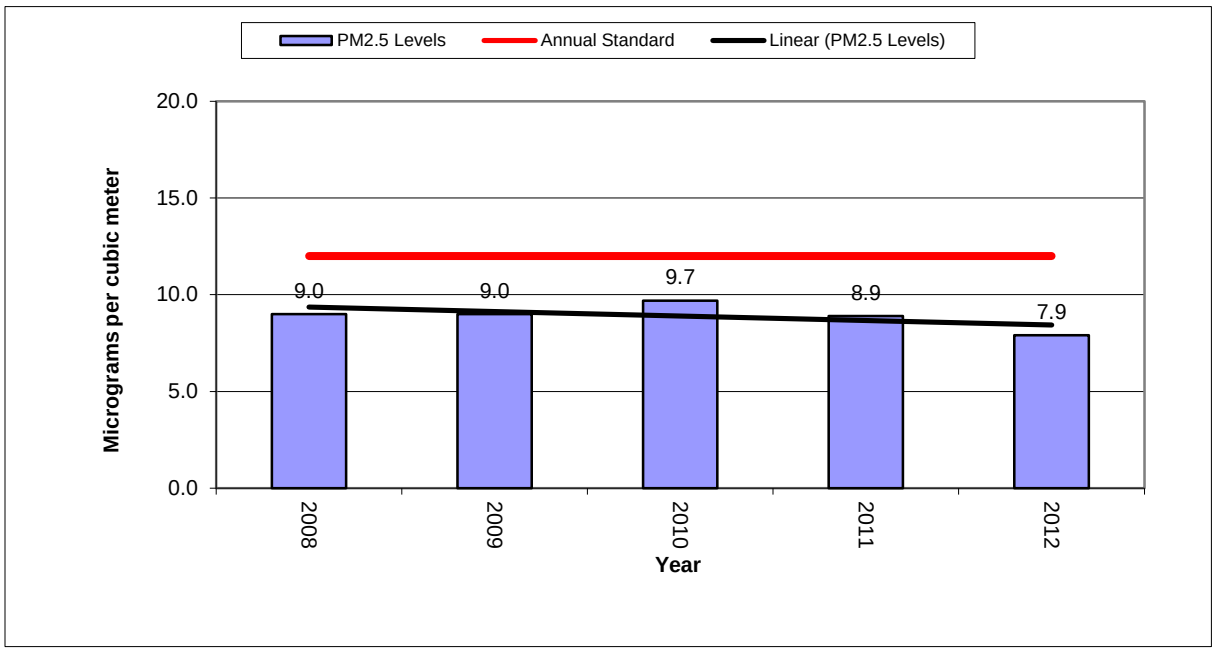


7.4.2.2 SD School Site – $PM_{2.5}$ Data

Figure 7-28 contains a graph of the annual averages. Annual averages for the SD School Site range from a low of 7.9 ug/m^3 in 2012 to a high of 9.7 ug/m^3 in 2010. The 2012 sampling year recorded a slightly lower concentration as was recorded in 2011. Concentrations of $PM_{2.5}$ are some of the highest in the state at this site. In 2012, the SD School Site had concentrations of $PM_{2.5}$ that ranked the fifth highest out of 11 sites in the state but in some of the previous years as one of the highest sites statewide.

This parameter is meeting the monitoring objective of population and high concentration and is a requirement of a NCore site. This parameter remains a priority because of past high concentrations levels for the annual and 24-hour standards and will be continued.

Figure 7-28 – SD School Site PM2.5 Annual Averages

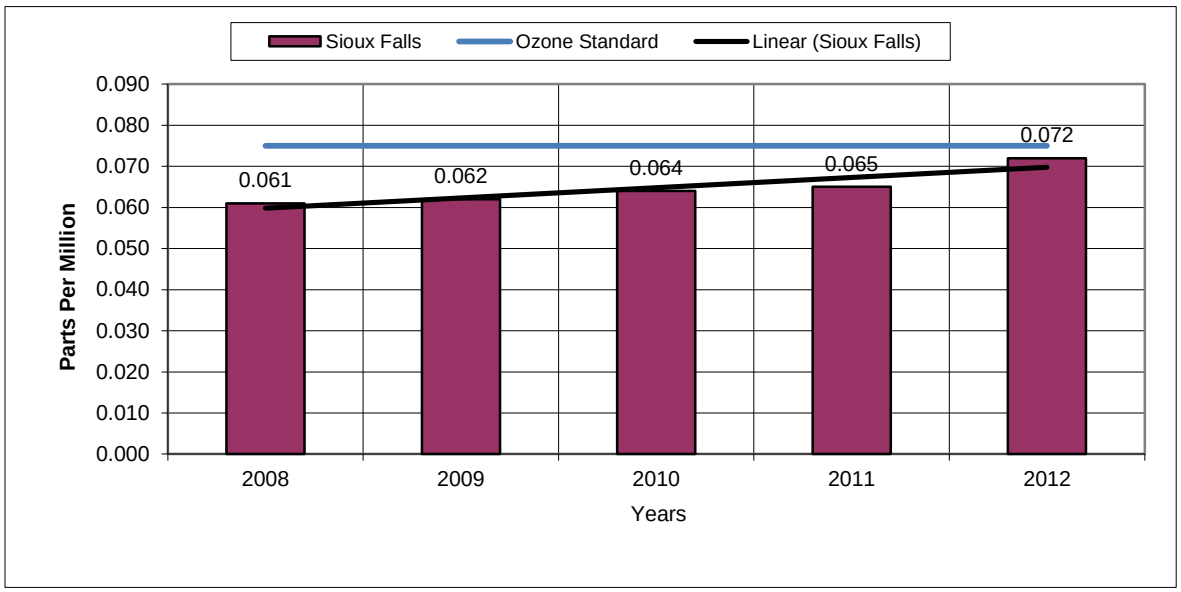


7.4.2.3 SD School Site – Ozone Data

Figure 7-29 contains a graph of each year's 4th highest ozone concentration level. The official yearly ozone season for South Dakota runs from June 1 to September 30. Past sampling experience shows some of the high ozone readings can occur outside of the official ozone season. The department operates the monitor year around instead of just during the ozone season.

The highest annual 4th highest 8-hour ozone concentration recorded at this site was in 2012 at 0.072 ppm. The lowest annual 4th highest 8-hour ozone concentration was recorded at 0.061 ppm in 2008. The trend line shows an increasing level of ozone over the five years of testing. Ozone concentrations in 2012 increased by 11 ppb from the first year of testing and are within 96% of the standard.

Figure 7-29 – SD School Site Ozone Yearly 4th Highest 8-Hour Averages

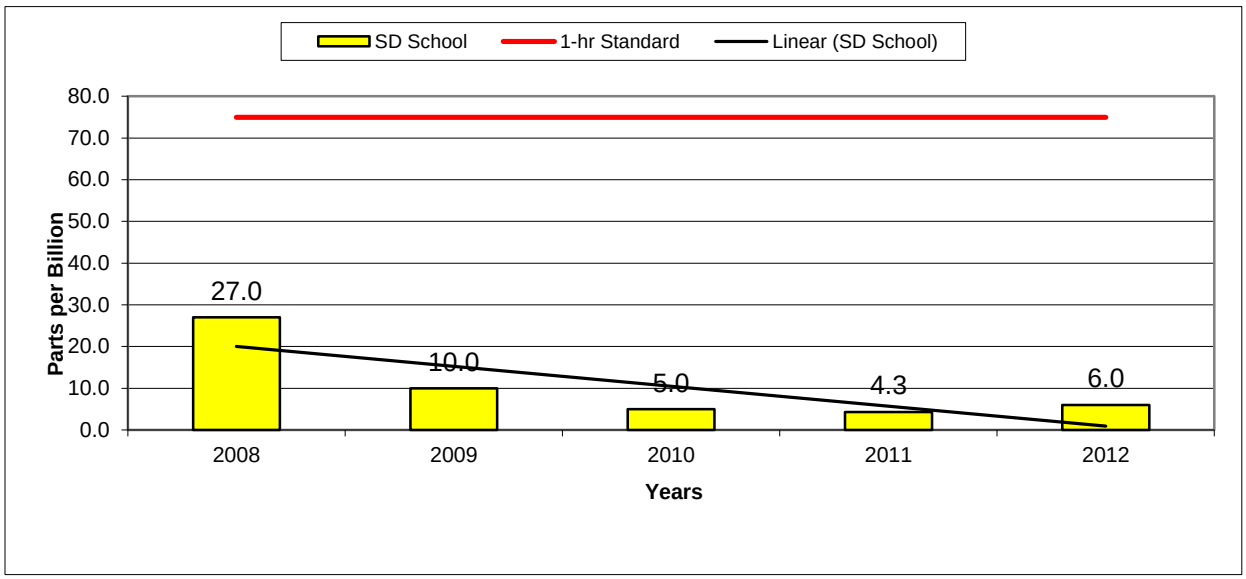


This parameter is meeting the monitoring objective of population and high concentration. Ozone will continue to be monitored at this site because the ozone concentrations are getting very close to the current standard, concentrations are continuing to increase, and this parameter is a requirements of a NCore site.

7.4.2.4 SD School Site – Sulfur Dioxide Data

Figure 7-30 contains a graph of the sulfur dioxide yearly 1-hour 99th percentile for each sampling year. The concentration levels of sulfur dioxide have dropped since the first year of testing. The type of analyzer was changed to a trace level sulfur dioxide analyzer in 2011. In 2012, concentrations of sulfur dioxide leveled off and increase from the previous years. The trend line shows a sharp drop in concentrations of sulfur dioxide over the five years of testing.

Figure 7-30 – SD School Site Sulfur Dioxide Yearly 1-hour 99th Percentile



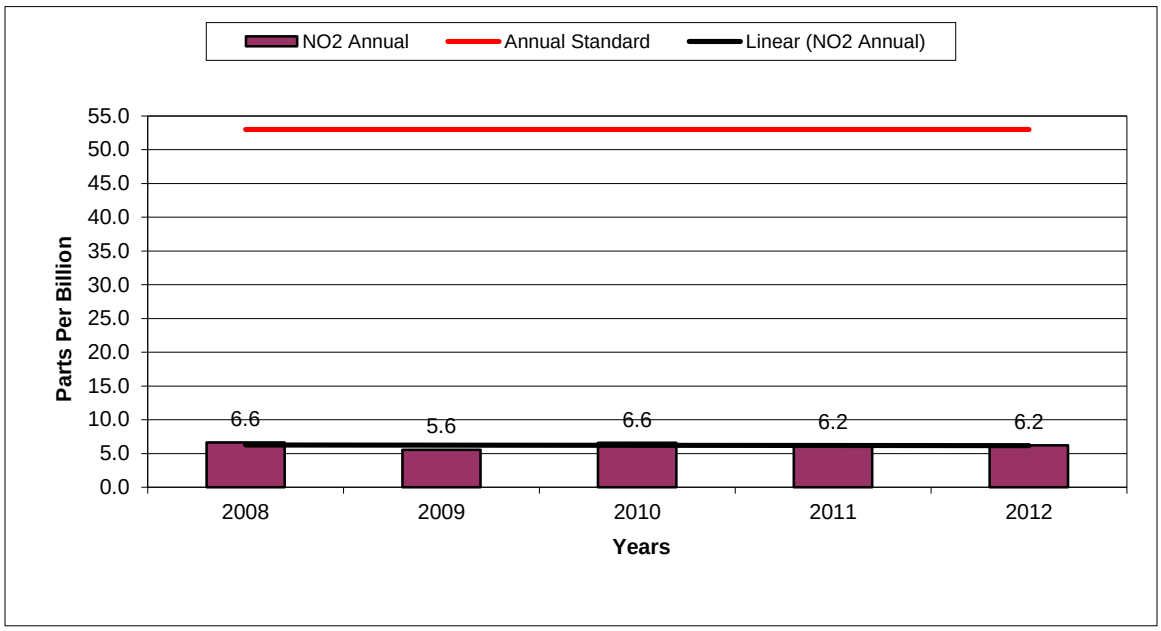
This parameter is meeting the monitoring objective of population and high concentration and is a requirement of a NCore site. Sulfur dioxide will continue to be monitored at this site.

7.4.3 SD School Site – Nitrogen Dioxide Data

Figure 7-31 shows the annual average for each of the years that data was collected. The nitrogen dioxide concentrations at the SD School Site represent the second highest nitrogen dioxide concentrations in the state. There is only 1 ppb difference in annual concentration levels from highest annual average of 6.6 ppb in 2008 and the lowest of 5.6 ppb in 2009. Trends show concentrations are steady at this site.

This parameter is meeting the monitoring objective of population and high concentration and is a requirement of a NCore site. Nitrogen dioxide will continue to be monitored at this site.

Figure 7-31 – SD School Site Nitrogen Dioxide Annual Averages



7.5 Aberdeen Area

In 2012, one sampling site was operated in the city of Aberdeen at the Fire Station #1 Site. The Fire Station #1 Site was established in 2000 as part of the implementation of the $PM_{2.5}$ air monitoring network. The parameters tested at the site include PM_{10} and $PM_{2.5}$. The monitoring site is located in the center of the city on top of the fire station roof just east of the main downtown business area. The area around the site has service type businesses, county and city offices, and residential area to the east. See Figure 7-32 for a picture of the monitoring site

Figure 7-32 – Aberdeen's Fire Station #1 Site [1]

[1] – Looking Southwest

In 2009, Fire Station #1 was renovated and a small addition was added to the south side of the building. The addition required no changes at the site so the location requirements in 40 CFR Part 58 are still met. Table 7-9 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

Table 7-9 – Fire Station #1 Site Specifics

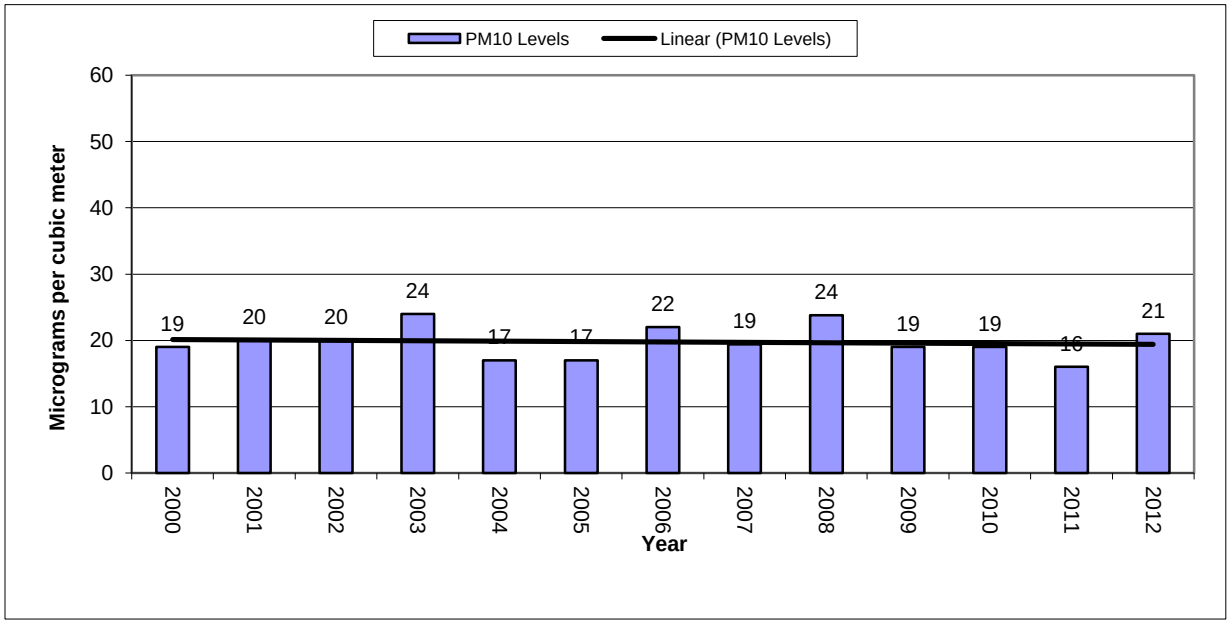
Parameter	Information
Site Name	Fire Station #1
AQS ID Number	46-013-0003
Street Address	111 2nd Ave SE, Aberdeen, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 540,216.92 N 5,034,545.94
MSA	None
PM_{10}	**(Manual)**
Sampler Type	Federal Reference Method RFPS-1287-063

Parameter	Information
Operating Schedule	Every 6th Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	Hi-Vol SA/GMW-1200
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS),
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0804-153
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	Partisol 2000 w/VSCC
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.5.1 Fire Station #1 Site – PM_{10} Data

In 2009 the sampling schedule for PM_{10} changed from every third day to every 6th day because concentrations at the site continue to be low and the chance of recording a concentration over the current standard are very low. Figure 7-33 contains a graph of the annual averages since the site was setup in 2000. The annual average concentrations fluctuate from year to year but with the addition of the annual average for 2012 the trends line indicates a steady levels over the thirteen years of testing. The annual averages range from a low of 16 ug/m^3 in 2011 to a high concentration level of 24 ug/m^3 recorded in 2003 and 2008.

Figure 7-33 – Fire Station #1 Site PM10 Annual Averages

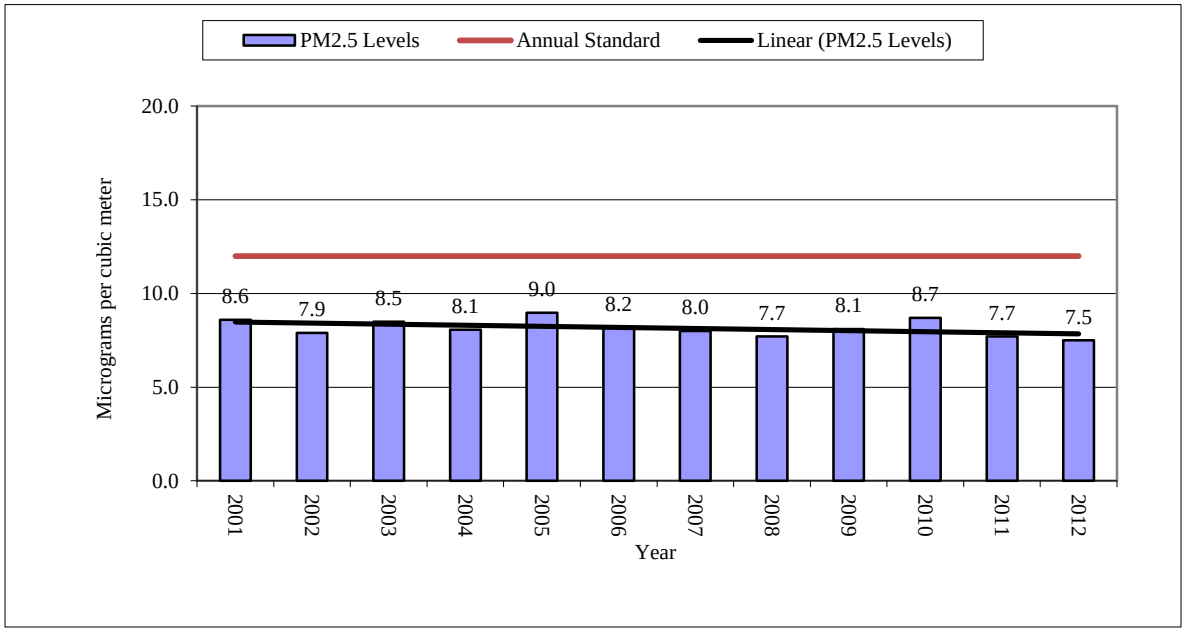


This parameter is meeting the monitoring objective of population and high concentration. The testing for this parameter will continue to monitor any impacts in the area.

7.5.2 Fire Station #1 Site – $PM_{2.5}$ Data

Figure 7-34 contains a graph of the annual average concentrations. Annual averages for the Fire Station #1 Site in Aberdeen range from 7.5 ug/m^3 in 2012 to 9.0 ug/m^3 in 2005. The 2012 annual average concentration was slightly lower then was recorded in 2011 by 0.2 ug/m^3. The trend line shows the annual concentration average is declining slightly over the last twelve years.

Figure 7-34 – Fire Station #1 Site PM2.5 Annual Averages



This parameter is meeting the monitoring objective of population and high concentration. The testing for this parameter will continue to monitor any impacts in the area.

7.6 Brookings Area

In 2012 two air monitoring sites were operated in the Brookings County. The oldest site is located at the City Hall building in the center of the city of Brookings. Testing at this site includes PM_{10} and $PM_{2.5}$ parameters. The Research Farm Site was setup in 2008 and is located at the Soil Conservation Farm northwest of the city of Brookings. Testing at this site includes ozone and meteorological data.

PM_{10} sampling began at this site in 1989. At the beginning of 2011 the manual monitors were replaced with a continuous.

7.6.1 City Hall Site

The City Hall Site was established in 1989 and sampled for levels of PM_{10}. The site is the result of a cooperative effort between the department and the city of Brookings. The area to the west of the site is residential and the areas north, east, and south have service oriented businesses and light industry. Brookings is a growing community with a population of 22,056 and has a growing industrial base. In 1999, $PM_{2.5}$ monitors were added to the site. The sampling frequency in 2012 for PM_{10} was every day and $PM_{2.5}$ is every third day. Figure 7-35 shows a current picture of the monitoring site.

Figure 7-35 – City Hall Site [1]

[1] – Looking North

Table 7-10 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

Table 7-10 – City Hall Site Specifics

Parameter	Information
Site Name	City Hall
AQS ID Number	46-011-0002
Street Address	311 3rd Avenue, Brookings, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 675,410.76 N 4,908,468.06
MSA	None

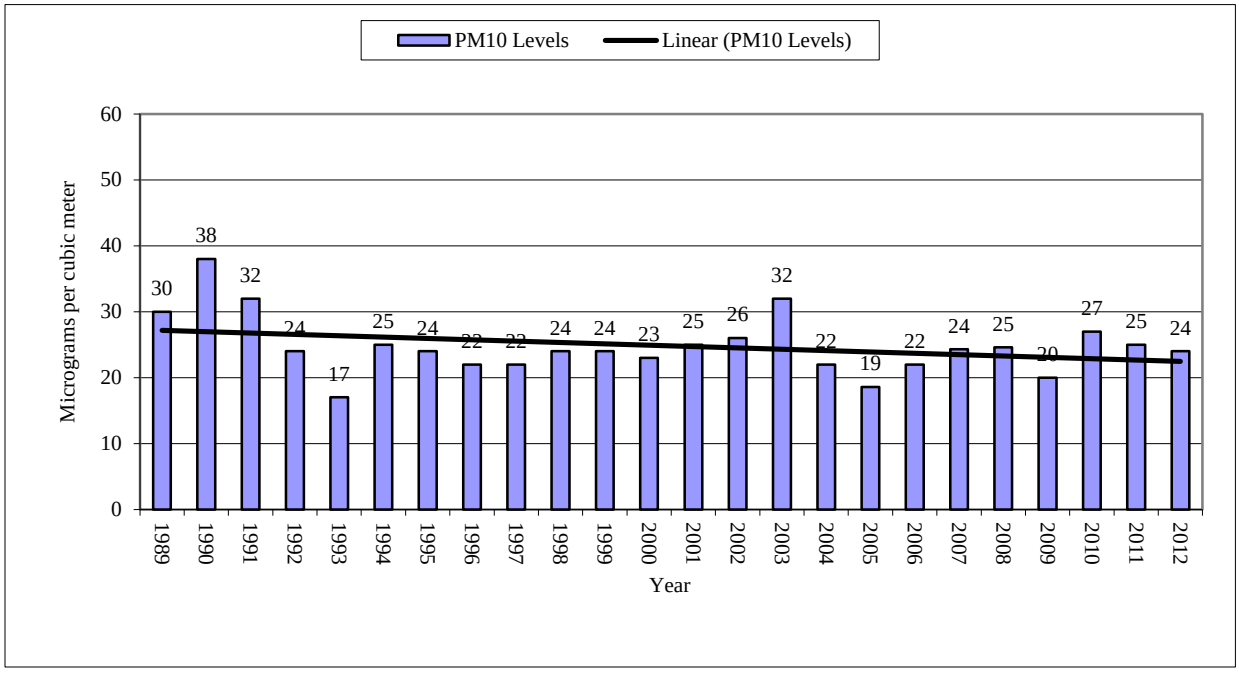
Parameter	Information
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Methods	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-Time Data
$PM_{2.5}$	**(Manual)**
Sampler Type	Federal Equivalent Method EQPM-0202-143
Operating Schedule	Every 3rd Day
Scale Representation	Neighborhood
Monitoring Objective	Population and High Concentration
Sampling Method	R&P Partisol 2000 w/VSCC
Analysis Methods	Gravimetric
Data Use	SLAMS (Comparison to the NAAQS)

7.6.1.1 City Hall Site – PM_{10} Data

In Figure 7-38, there is a graph of the yearly annual averages since the site was setup in 1989. The annual averages range from a high of 38 ug/m^3 in 1990 to a low of 17 ug/m^3 in 1993. The trend line shows concentration levels declining over the 24 years the site has been operating; but for the last nine years has fluctuated in approximately the 20 ug/m^3 range. In 2012, PM_{10} concentrations were down slightly from the previous year.

The sampling parameter is meeting the goals of high concentration and population and will be continued to monitor any impacts in the area.

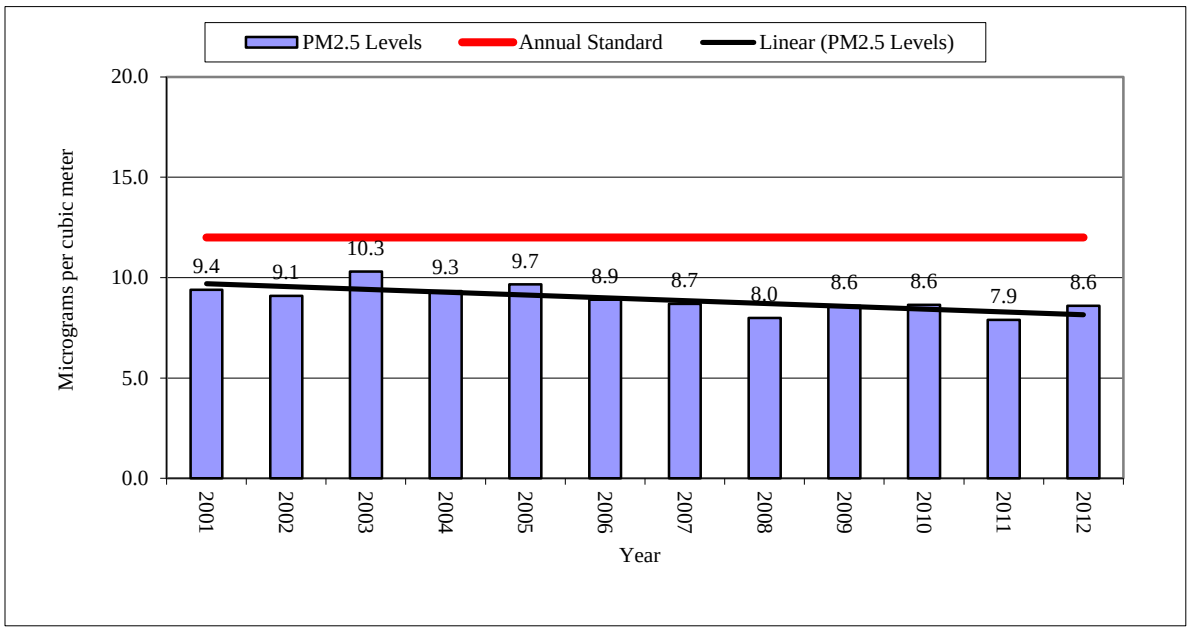
Figure 7-36 – City Hall Site PM10 Annual Averages



7.6.1.2 City Hall Site – $PM_{2.5}$ Data

Figure 7-37 contains a graph of the annual average concentrations. The $PM_{2.5}$ monitors run on an every third day schedule since the site was setup in 1999. Problems associated with the sampler design kept the number of valid data below the 75% completeness until the start of 2001. Annual averages for the City Hall Site range from a high of 10.3 ug/m^3 in 2003 to a low of 7.9 ug/m^3 in 2011. The trends for the twelve years of testing show a decrease in $PM_{2.5}$ levels overall. In 2012, $PM_{2.5}$ annual average concentration were up slightly than recorded in 2011.

Figure 7-37 – City Hall Site PM2.5 Annual Averages



Testing for this parameter is meeting the goals of high concentration and population and will be continued to monitor any impacts in the area.

7.6.2 Research Farm Site

The Research Farm Site was set up in cooperation with the 3M Company in Brookings and Valero Renewable Fuels Company near the city of Aurora which provided the equipment for the site. The sampling is a requirement of the Prevention of Significant Deterioration permits for both facilities. The department is operating the site and provided data to the facilities. The 3M Company has completed their air monitoring report using the data for 2008. Valero Renewable Fuels Company decided not to complete the facility upgrade under its Prevention of Significant Deterioration permit and no longer needs data from the Research Farm Site. Ozone data collected between 2008 and 2010 was added as a SLAMS site to the National Database in 2010.

The site location is outside of the nitrogen dioxide one microgram area modeled for the facilities in the Brookings area. The site collects data for ozone and meteorological parameters. The goals of the monitoring site were the evaluation of impacts to the ozone concentrations from modification at the 3M Company and Valero Renewable Fuels Company and to date the goals have been met. New goals have been added to collect ozone data downwind of a small city and for comparison to the NAAQS. The completion of the 2012 sampling year provides the five years of testing and a better idea of trends for the site ozone data. Figure 7-40 shows a current picture of the monitoring site.

Table 7-11 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

Figure 7-38 – Research Farm Site [1]

[1] – Looking North

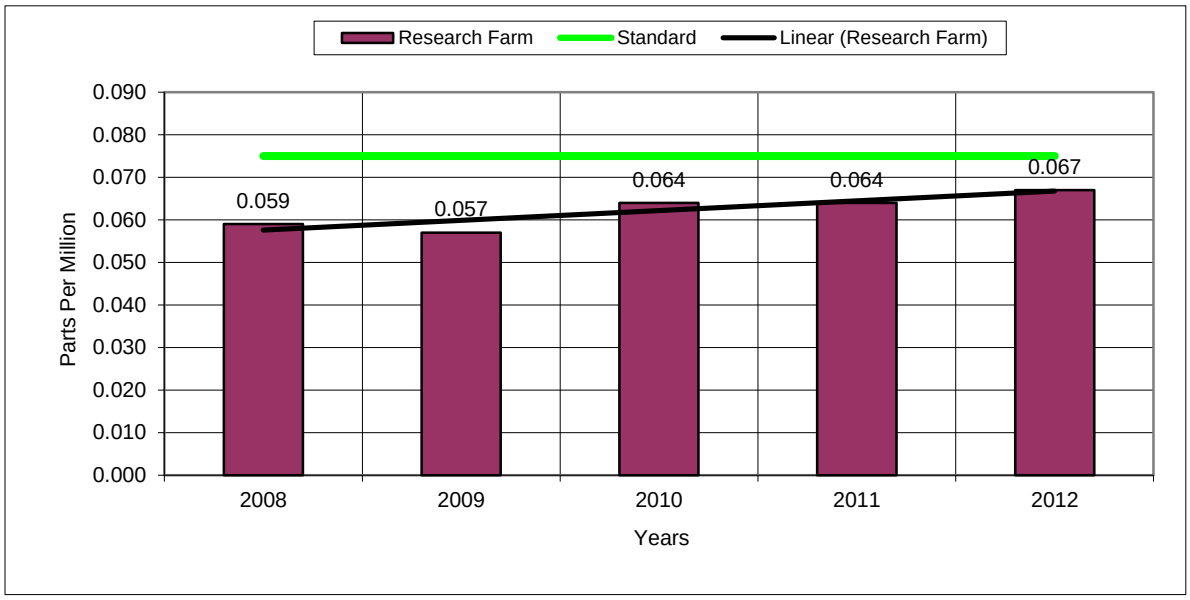
Table 7-11 – Research Farm Site Specifics

Parameter	Information
Site Name	Research Farm
AQS ID Number	46-011-0003
Street Address	3714 Western Ave.
Geographic Coordinates	UTM Zone 14, NAD 83, E 674766.316 N 4912930.911
MSA	None
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	High Concentration, Population, and Background
Sampling Method	Thermo 49i
Analysis Methods	ultraviolet
Data Use	SLAMS (Comparison to the NAAQS),

7.6.2.1 Research Farm Site – Ozone Data

The graph in Figure 7-39 shows the yearly 4th highest ozone concentration level for the last five years. In 2012, the Research Farm Site recorded the high ozone concentration at 0.067 ppm which is under the standard of 0.075 ppm. The current ozone data indicates increasing levels of ozone. The ozone sampling sites along the eastern edge of state have all had an increase in ozone levels the last four years.

Figure 7-39 – Research Farm Site Ozone Yearly 4th Highest 8-Hour Averages



The testing for this parameter is meeting the goals of a SLAMS location and will be continued because as one the three sites recording the highest concentrations in the state it is meeting the goal of high concentration and population.

7.7 Watertown Area

In 2012, one sampling site was operated in the city of Watertown and is identified as the Watertown Site. Watertown is the fourth largest city in South Dakota with a population of 21,482. The city has an increasing growth rate and industrial base. The industrial base is a mixture of service-oriented business and light industry. One other air monitoring site was operated in Watertown starting in 1974 and closed in 1987. Figure 7-40 shows a picture of the monitoring site.

The current Watertown Site was established in 2003 as part of the implementation of the $PM_{2.5}$ network. The parameters tested at the site include PM_{10} on a sampling frequency of every day and $PM_{2.5}$ at a sampling frequency of every third day. In 2012, the manual $PM_{2.5}$ monitors were replaced with a continuous monitor.

The monitoring site is located in the western third of the city just east of an industrial park area. The site is located on the roof of a monitoring shelter. The area around the site has service type businesses and light industry to the west and south. Residential areas are located to the north and east of the site. There have been no significant changes noted in buildings or trees around the site in 2012.

Figure 7-40 – Watertown Site [1]

[1] – Looking Northeast

Table 7-12 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

Table 7-12 – Watertown Site Specifics

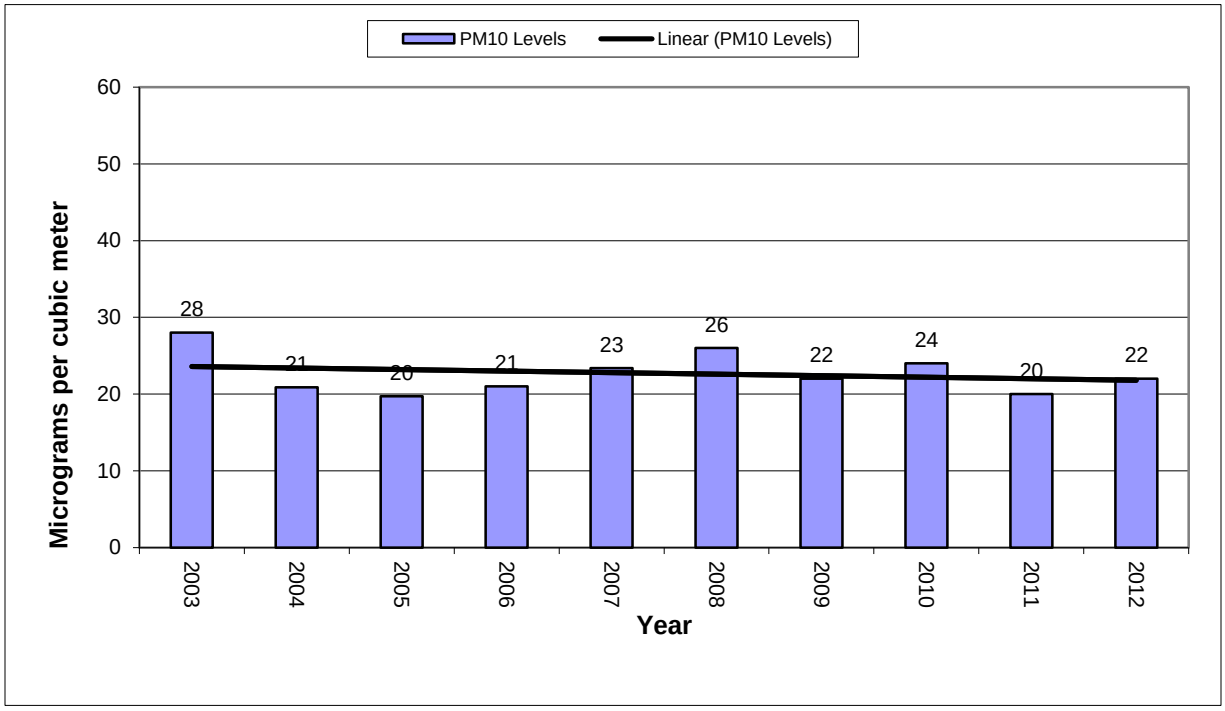
Parameter	Information
Site Name	Watertown
AQS ID Number	46-029-0002
Street Address	801 4th Ave. SW, Watertown, SD
Geographic Coordinates	UTM Zone 14, NAD 83, E 647,740.74 N 4,973,300.25
MSA	None
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day

Parameter	Information
Scale Representation	Neighborhood
Monitoring Objective	High Concentration and Population
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Methods	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-Time Data
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0598-0119
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SPMS

7.7.1 Watertown Site PM_{10} Data

The PM_{10} monitor operated on an every third day sampling schedule until 2006 when a continuous PM_{10} monitor replaced the manual monitors and an everyday sampling schedule began. Figure 7-41 contains a graph of the annual averages. The highest recorded annual average for PM_{10} concentrations was 28 ug/m^3 recorded in 2003. The lowest annual average concentration of 20 ug/m^3 was recorded on the manual monitor in 2005 and the continuous monitor in 2011. In 2012, concentrations were up slightly from the previous year at 22 ug/m^3. The annual average indicates concentration levels are slightly decreasing during the ten years of testing.

Figure 7-41 – Watertown Site PM_{10} Annual Averages

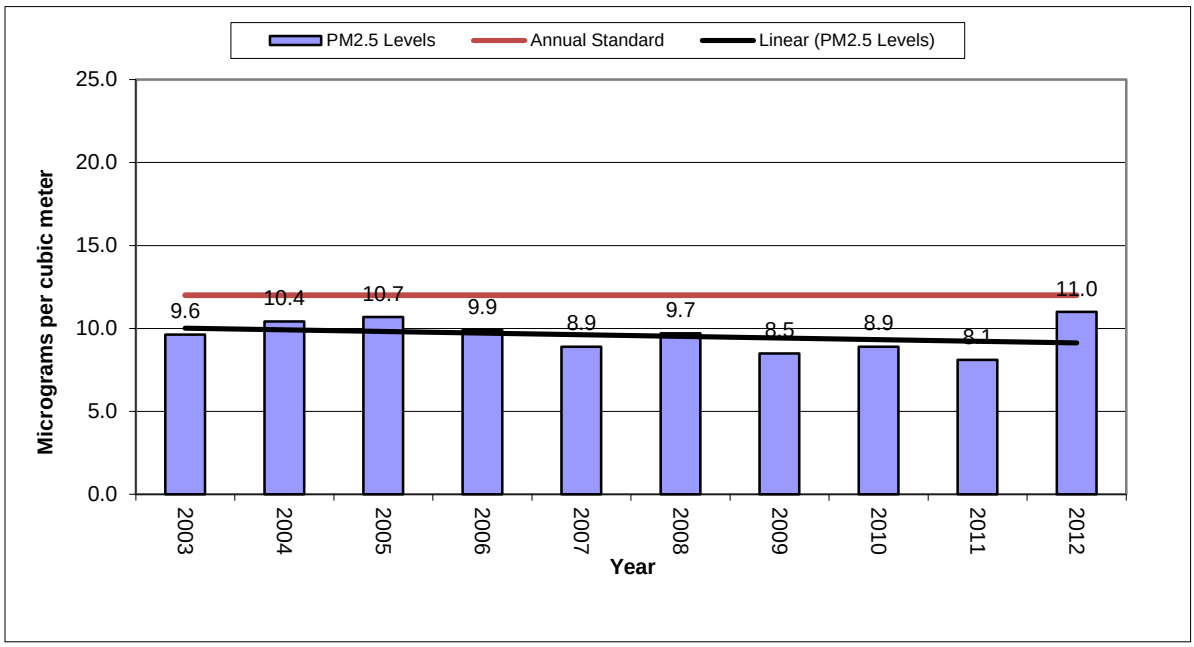


Testing for this parameter is meeting the goals of high concentration and population and will be continued to monitor any impacts in the area.

7.7.2 Watertown Site $PM_{2.5}$ Data

The $PM_{2.5}$ monitors run on an every third day schedule since the $PM_{2.5}$ monitors were setup in 2003. Beginning in 2012 a continuous monitor was installed and the site reported hourly concentrations on an everyday schedule. Figure 7-42 contains a graph showing the annual average concentration for each year of operation. Annual averages for the Watertown Site range from a high of 11.0 ug/m^3 in 2012 to a low of 8.1 ug/m^3 in 2011. The annual average shows a decrease in $PM_{2.5}$ concentration levels over the ten years of testing even when including the 2012 year.

Figure 7-42 – Watertown Site PM2.5 Annual Averages



Testing for this parameter is meeting the goals of high concentration and population and will be continued to monitor any impacts in the area plus determine if the higher $PM_{2.5}$ concentrations observed in 2012 continue.

7.8 Union County Area

At the beginning of 2009, three new monitoring sites were set up in Union County. No ambient air quality testing had ever been completed in this county. All three sites are located north of Elk Point. The sampling goals for the new sites were to determine air pollution levels near the location of the proposed Hyperion Energy Center prior to construction, during construction, and post construction. Currently, the proposed project's air quality permit to construct has expired and no new application was submitted by the company. By the end of 2013, the sites will have collected five years of data which is an adequate amount of data for use to determine background levels. With no current project pending there is only need for one site to continue to show currently levels in rural Union County.

In 2012, UC #3 Site was closed and the only sampling parameter, ozone, was moved to UC #1 to continue the testing for this parameter. Sites UC #1 and UC #2 both are collecting data for PM_{10}, $PM_{2.5}$, SO_2, and NO_2. In addition, UC #1 is collecting CO data since 2010. The data collected from 2009 to 2012 is being evaluated as part of this report to determine which site will be used to continue the testing.

Currently, the sampling goals are rural background, transport and population exposure with the data being compared to the NAAQS. Plans are to be operating only one site in Union County by the start of 2014.

7.8.1 UC #1 Site

UC #1 Site is located about 3 miles south of the proposed Hyperion Energy Center. Sampling began on or near January 1, 2009 for all but carbon monoxide. By the beginning of 2010, the carbon monoxide analyzer was added to the site. The goals of the site are background and comparison to the NAAQS. Figure 7-43 provides a picture of the monitoring site looking to the southeast.

Figure 7-43 – UC #1 Site

[1] – Looking Southeast

Table 7-13 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

Table 7-13 – UC #1 Site Specifics

Parameter	Information
Site Name	UC #1
AQS ID Number	46-127-0001
Street Address	31988 457th Ave.
Geographic Coordinates	Lat. + 42.751518 Long. – 96.707208

Parameter	Information
MSA	Sioux City, IA-NE-SD
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS)
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0598-0119
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SPMS
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 43i Trace Level Thermo
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS)
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 42i Thermo/Fisher
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS)
CO	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental API 300EU Trace Level
Analysis Method	Ultraviolet
Data Use	SLAMS (Comparison to the NAAQS)

7.8.2 UC #2 Site

UC#2 Site is located about 1 ½ miles north northwest of the proposed Hyperion Energy Center. At the end of 2011, the manual $PM_{2.5}$ monitors were removed so only the continuous monitor is now operated. Figure 7-44 contains a picture of the monitoring site looking west.

Table 7-14 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

Figure 7-44 – UC #2 Site [1]

[1] – Looking Southwest

Table 7-14 – UC #2 Site Specifics

Parameter	Information
Site Name	UC #2
AQS ID Number	46-127-0002
Street Address	31307 473 Ave.
Geographic Coordinates	Lat. + 42.850975 Log. – 96.747325
MSA	Sioux City, IA-NE-SD

Parameter	Information
PM_{10}	**(Continuous)**
Sampler Type	Federal Equivalent Method EQPM-1102-150
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	T A Series FH 62 C14 Continuous
Analysis Method	Beta Attenuation
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
Operational Status	No change planned for 2010
$PM_{2.5}$	**(Continuous)**
Sampler Type	Federal Equivalent Method RFPS-0598-0119
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Met One BAM-1020 w/$PM_{2.5}$ VSCC
Analysis Method	Beta Attenuation
Data Use	Real-time Data and SPMS
SO_2	**(Continuous)**
Sampler Type	Federal Equivalent Method EQSA-0486-060
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 43i Trace Level Thermo/Fisher
Analysis Methods	Pulsed Fluorescent
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data
NO_2	**(Continuous)**
Sampler Type	Federal Reference Method RFNA-1289-074
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Instrumental 42i Thermo
Analysis Method	Chemiluminescence
Data Use	SLAMS (Comparison to the NAAQS) Real-time Data

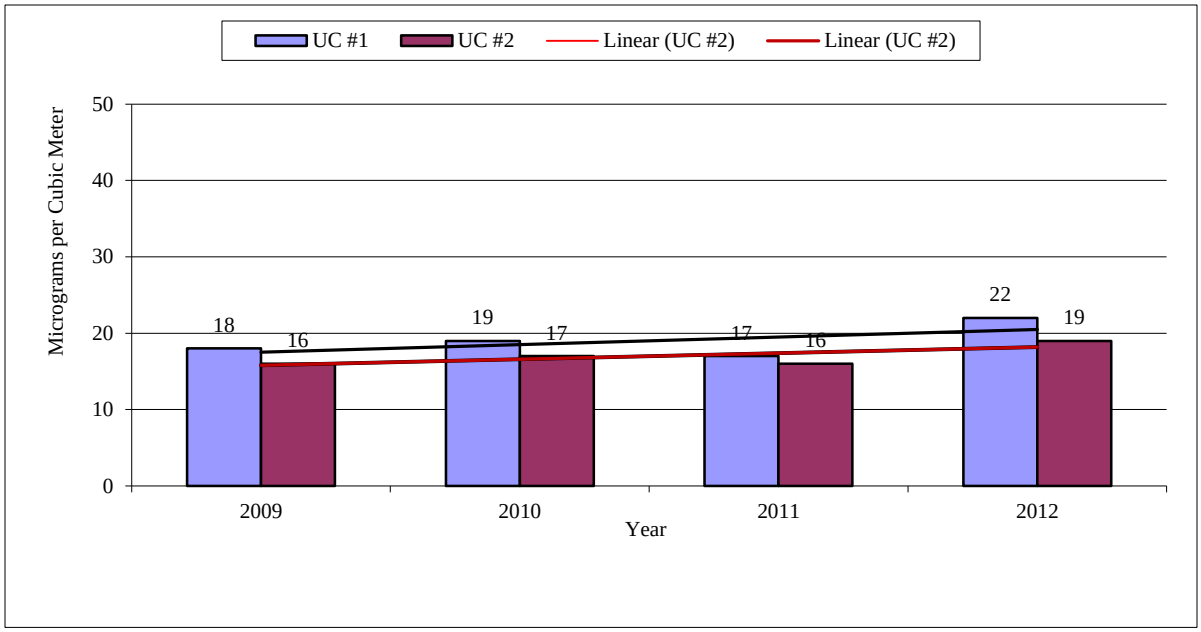
7.8.3 UC #1 and UC #2 Sites – PM_{10} Data

See the annual averages for the two sites in Union County in Figure 7-45. The average concentrations of PM_{10} in Union County represent concentration levels similar to other sites in eastern South Dakota. The annual average concentrations in eastern part of the state range from 15 to 22 ug/m^3. The Union County sites annual averages ranked in the middle to the lower end of this range.

PM_{10} point source emissions have localized impacts due to the size and weight of the particles. Therefore, low annual averages close to the same concentration level at both sites would be

expected in a rural area with only fugitive dust sources. Because of differences in localized fugitive dust sources such as tilling of agricultural fields, gravel roads, and associated wind speed and direction during the activities can have a larger effect on differences in 24-hour concentration levels between the two sites. Based on four years of data, trends indicate concentrations are up slightly for UC #1 and UC #2 with UC #1 having the highest average concentration level between the two sites. Data indicates in general UC #1 would provide data that would represent Union County rural PM_{10} concentrations.

Figure 7-45 – Union County Annual PM10 Concentrations

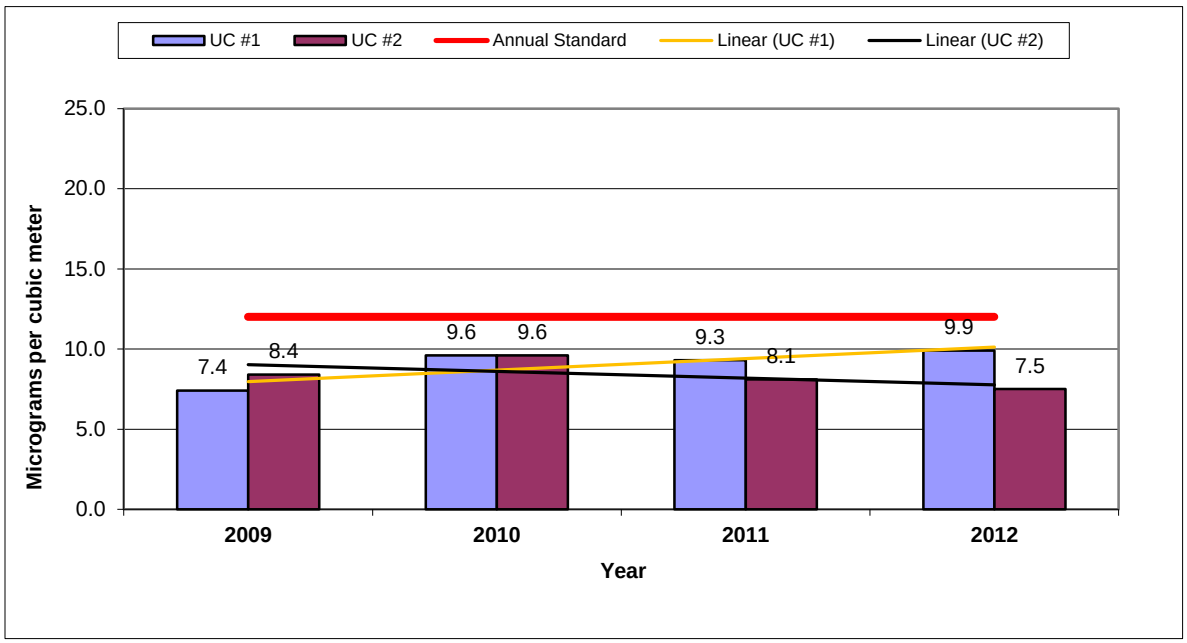


7.8.4 UC #1 and UC #2 Sites – $PM_{2.5}$ Data

The annual average concentrations for $PM_{2.5}$ at the two sites would be expected to be close to the same level. When comparing the activities around the two sites the differences include a highway running just north of UC #2 and a small group of homes and business near this site. UC #1 has only one home near the site but has Interstate 29 about 1.5 miles to the southwest. Therefore, there may be some concentration difference between the two sites.

In this case the annual averages were compared between both continuous monitors. See Figure 7-46 to view a graph of the annual averages.

Figure 7-46 – Union County Annual PM2.5 Concentrations



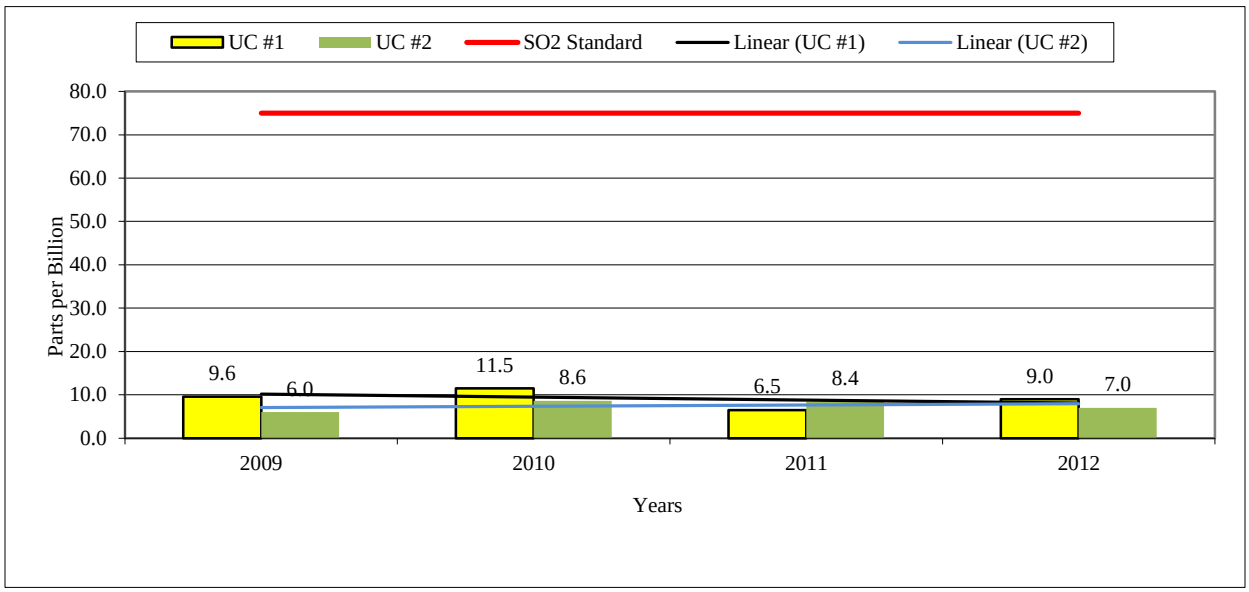
The first year of testing UC #2 had the highest annual average $PM_{2.5}$ concentration of the two sites. In 2010, both sites had the same annual average concentration of $PM_{2.5}$. Since 2010 UC #1 has the highest annual average and in 2012 recorded the highest annual average since testing began in Union County. The trend lines show concentrations increasing at UC #1 and decreasing at UC #2 over the four year period.

It appears UC #1 shows higher PM2.5 concentrations then UC #2 and would provide data that would represent Union County rural $PM_{2.5}$ concentrations.

7.8.5 UC #1 and UC #2 Sites – Sulfur Dioxide Data

Concentrations of sulfur dioxide follow the same trend as other sites in the state with many hourly average concentrations low. Trace level sulfur dioxide analyzers are operated at both sites beginning in 2009. See Figure 7-47 for a graph showing the 1-hour 99th percentile for both sites.

Figure 7-47 – Union County Sulfur Dioxide Concentrations



Differences in concentration levels are noted between the two sites when comparing the 1-hour averages but the 3-year average of the 99th percentile for both sites shows the level at UC #1 at 1 ppb higher than UC #2. In both cases, the sulfur dioxide concentrations are well below the NAAQS standard. Data indicates in general UC #1 would provide data that would represent Union County rural SO_2 concentrations.

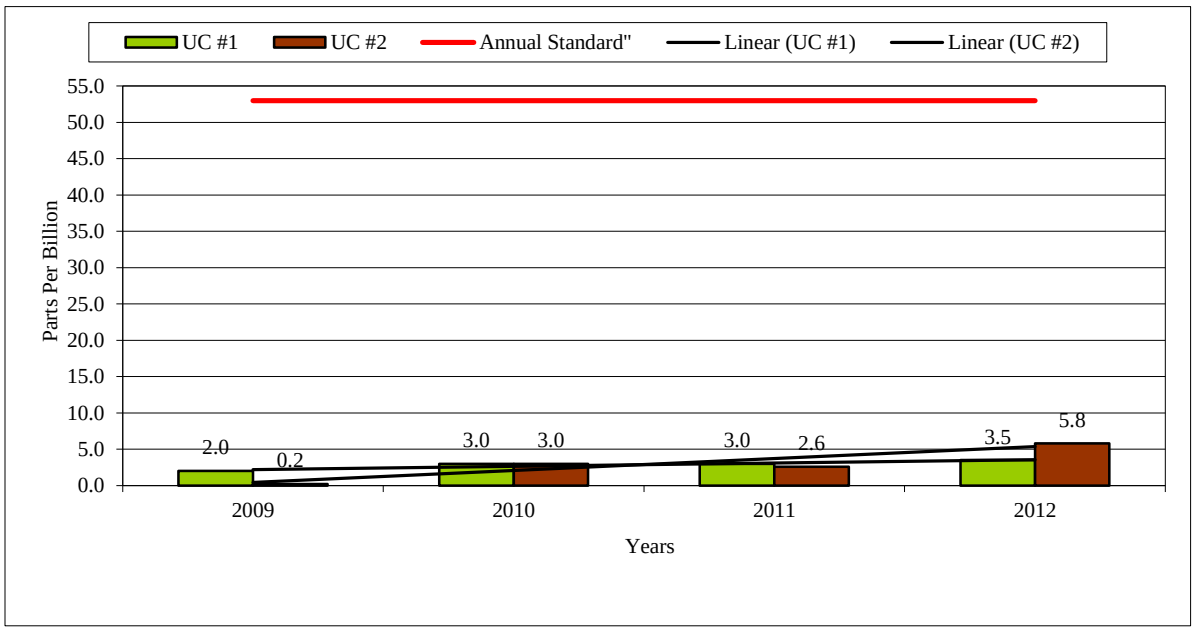
7.8.6 UC #1 and UC #2 Sites – Nitrogen Dioxide Data

Concentrations of nitrogen dioxide follow the same trends as other rural sites in the state like the Badlands and Wind Cave sites. Annual average concentrations are very low. Just as the sulfur dioxide parameter, the nitrogen dioxide parameter differences are noted when comparing a 1-hour average but the annual averages are very close in concentration.

The only exception was unusual events at UC #2, starting in late August and to the end of December, NO2 concentrations were significantly higher than in previous years. An investigation in the cause did not find a cause to the high concentration period. Even with higher levels in the fourth quarter of 2012 annual concentrations were still well below the standard at UC #2. By end of January 2013, concentrations of NO_2 were back to past year's levels.

Figure 7-48 shows a graph of the annual average concentrations for both sites. Trends indicate a slightly increasing concentration levels over the four year period which is mainly the result of the higher NO_2 concentrations in 2012. Data indicates in general UC #1 would provide data that would represent Union County rural NO_2 concentrations.

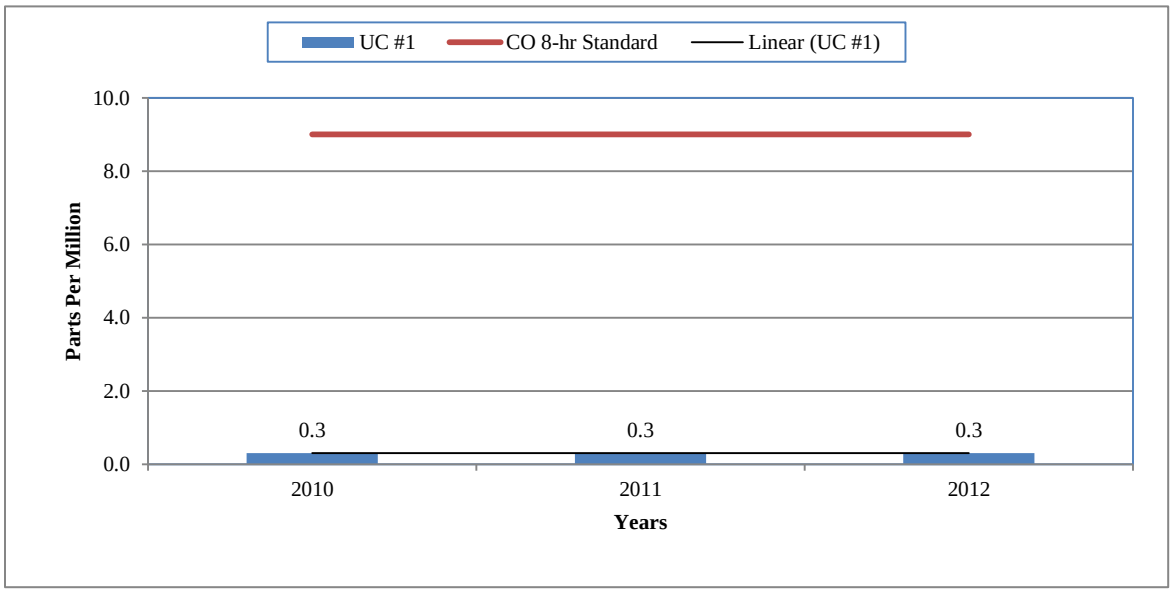
Figure 7-48 – Union County Nitrogen Dioxide Concentrations



7.8.7 UC #1 Site – Carbon Monoxide Data

The testing for carbon monoxide is done only at UC #1 Site. Testing began in 2010 and at the end of 2012 three years of testing has been completed. Carbon monoxide concentrations are very low in Union County. The concentrations of carbon monoxide represent background for a rural area in southeastern part of the state and may represent most of the rural areas in the state. Figure 7-49 shows the results of testing for carbon monoxide 8-hour averages for UC #1 Site.

Figure 7-49 – UC #1 Site Carbon Monoxide Concentrations



It appears from the data review that UC #1 would provide the best site to represent the Union County rural area providing background data for future development use and to compare to the NAAQS standards. However, with the low concentrations, the department will need to determine if carbon monoxide monitoring should continue at this site.

7.8.8 UC #3 Site

UC #3 Site is located about 3 ½ miles north and 2 miles west of the proposed Hyperion Energy Center. The 2012 year was the final year of testing providing four years of testing in Union County. The site was removed in the fall of 2012 and the ozone analyzer was moved to UC #1. Figure 7-50 contains a picture of the monitoring site looking northeast.

Figure 7-50 – UC #3 Site [1]

[1] – Looking northeast

Table 7-15 contains details on the monitoring site specific to the requirements in 40 CFR Part 58. It identifies the sampler site, operating schedule, scale representation, monitoring objective, sampling method, analysis method, and data use.

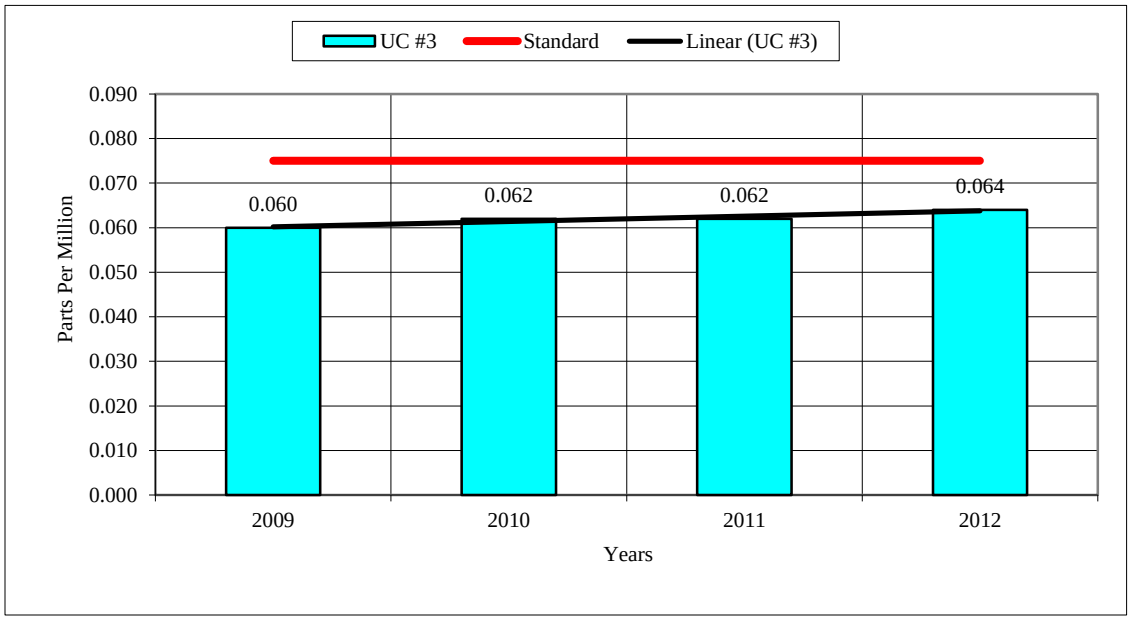
Table 7-15 – UC #3 Site Specifics

Parameter	Information
Site Name	UC #3
AQS ID Number	46-127-0003

Parameter	Information
Street Address	31102 47th Ave.
Geographic Coordinates	Lat. + 42.880212 Long. – 96.785339
MSA	Sioux City, IA-NE-SD
Ozone	**(Continuous)**
Sampler Type	Federal Equivalent Method EQOA-0880-047
Operating Schedule	Every Day
Scale Representation	Regional
Monitoring Objective	Background, Transport
Sampling Method	Thermo 49i
Analysis Method	Ultraviolet
Data Use	PSD and (Comparison to the NAAQS),

The ozone 8-hour average for the UC #3 Site recorded a concentration that was similar to levels recorded at the other two sites in the eastern part of the state in 2012. The trend line shows a slight increase in concentrations over the last four years. This is similar to the trends for the other two sites in the eastern part of the state. See Figure 7-51 for a graph of the ozone concentrations at the UC #3 Site.

Figure 7-51 – UC #3 Site Ozone Concentrations



Ozone monitoring will continue in this area but at the UC #1 site because the UC #3 Site trailer is no longer suitable for use and was removed.

8.0 SPECIAL AIR QUALITY MONITORING

8.1 Urban Air Toxics Monitoring Program (UATMP)

The first UATMP testing site in South Dakota was setup in Sioux Falls at the SF Hilltop Site in March of 2000, and sampled for hydrocarbons, halogenated hydrocarbons, and polar compounds. In 2002, carbonyls sampling was added. Sioux Falls is the largest city in the state. In 2008 the site was moved to the SD School Site. The main industrial area of the city is about 1.2 miles northwest of the site. The site was selected because it represents population exposure to chemical and particulate emissions from the industrial parts of the city. The predominant wind direction is northwest for most of the year with southeast winds during the summer months.

The second UATMP testing location in South Dakota was in Custer, South Dakota. The sampling site was near the Custer High School and began operation in 2001 with sampling completed at the end of 2007.

The third UATMP site was located in southeastern part of the state in Union County at the UC #1 Site. The UC#1 Site is located about 3 miles south of the proposed Hyperion Energy Center. The monitoring project objectives were to gather data to determine current pollution levels that can be compared to the air quality standards before construction of the project begins, collect data during plant construction, and determine levels during the operation of the facility. Sampling began in January 2009 and was completed at the end of 2011. Three years of data provides background data for future comparison if a large industrial facility is built in this area.

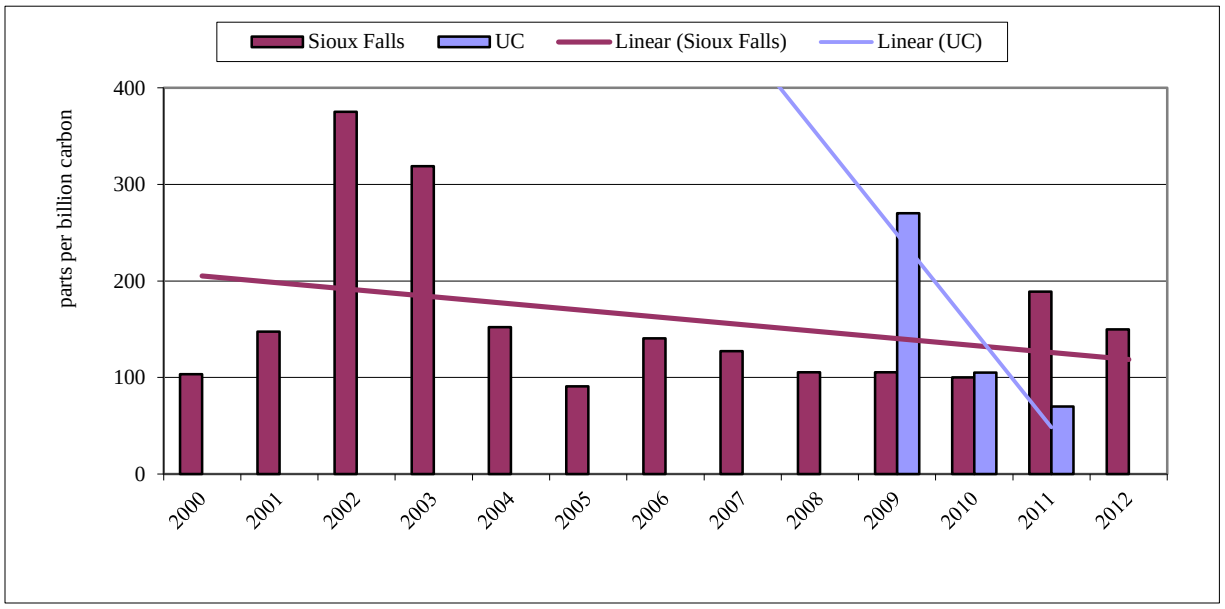
Table 8-1 shows the five pollutants the department is concentrating on and what the overall trend has been in Sioux Falls. The trend for these pollutants has been decreasing except for Acrolein.

Table 8-1 - Air Toxic Sampling Results in Sioux Falls for 2012

Air Toxic	Trend	Sources
1,3-Butadiene	Decrease	motor vehicle exhaust, manufacturing and processing facilities, forest fires or other combustion, and cigarette smoke
Formaldehyde	Decrease	power plants, manufacturing facilities, incinerators, and automobile exhaust emissions
Acetaldehyde	Decrease	an intermediate product of higher plant respiration and is formed as a product of incomplete wood combustion in fireplaces and wood stoves, coffee roasting, burning of tobacco, vehicle exhaust fumes, and coal refining and waste processing.
Acrolein	Increase	formed from the breakdown of certain pollutants found in outdoor air, from burning tobacco, or from burning gasoline.
Benzene	Decrease	found in emissions from burning coal and oil, motor vehicle exhaust, and evaporation from gasoline service stations and in industrial solvents

The program also opted to have total non-methane organic compounds (NMOC) sampled during the air toxics sampling. NMOC compounds are of particular interest because of their role in ozone formation. The average total NMOC values are shown in Figure 8-1. The 2008 through 2012 values in Sioux Falls are from the SD School Site and the previous values were from the SF Hilltop Site. The NMOC concentrations have fluctuated over the years in Sioux Falls.

Figure 8-1 - Average Total NMOC



8.2 $PM_{2.5}$ Speciation Monitoring Program

The chemical speciation network quantifies mass concentrations and significant PM2.5 constituents which include trace elements, sulfate, nitrate, sodium, potassium, ammonium, and carbon. This series of analytes is very similar to those measured within the Interagency Monitoring of Protected Visual Environments (IMPROVE) program at the two Class One National Parks in South Dakota.

Physical and chemical speciation data are anticipated to provide valuable information for:

1. Assessing trends in mass component concentrations and related emissions, including specific source categories.
2. Characterizing annual and seasonal spatial variation of aerosols.
3. Determining the effectiveness of implementation control strategies.
4. Helping to implement the PM2.5 standard by using speciation data as input to air quality modeling analyses.
5. Aiding the interpretation of health studies by linking effects to PM2.5 constituents.
6. Understanding the effects of atmospheric constituents on visibility impairment and regional haze.

South Dakota currently operates one site that collects samples as part of the Speciation Network. This site collects 24-hour air samples on an every third day schedule. The site is in Sioux Falls, located in southeastern South Dakota. Sioux Falls is the largest city in the state. The speciation monitor was moved from the KELO site to the SD School Site at the beginning of 2009. The SD School Site is located on the east central part of the city. The site is about 1.5 miles southeast of the main industrial area in Sioux Falls. The area around the site is mainly residential. Interstate 229 which is a major commuting road runs north and south about three city blocks east of the monitoring site. The predominant wind direction is northwest for most of the year with southeast winds during the summer months. Carbon samples were taken by the Met One SASS monitor. In September 2009, the IMPROVE model URG 3000N sampler was set up to do the carbon sampling to standardize the sampling method and make the data from the National Parks sites comparable to the speciation network nationwide.

Figure 8-2 shows a comparison of the PM2.5 concentrations between the speciation monitor, the manual monitor, and the continuous monitor located at this site. The continuous monitor shows a decrease in concentrations over the four years of testing. The manual monitors also show a decreasing concentration but at a slightly less level. The speciation monitor shows a slightly increasing concentration level. This is an unusual trend between the monitor types. It appears that sampling frequency may be the major issue on the difference in trends. The first two years of testing the speciation monitor ran on an every sixth day schedule. In 2011 and 2012, the schedule was changed to every third day. This reduced some of the difference in annual average concentration and brings the speciation monitor annual average comparable to the manual monitor annual average. The continuous monitor annual average is calculated using three times more samples so a difference in the annual mean is expected.

Figure 8-2 - Average PM2.5 Concentration

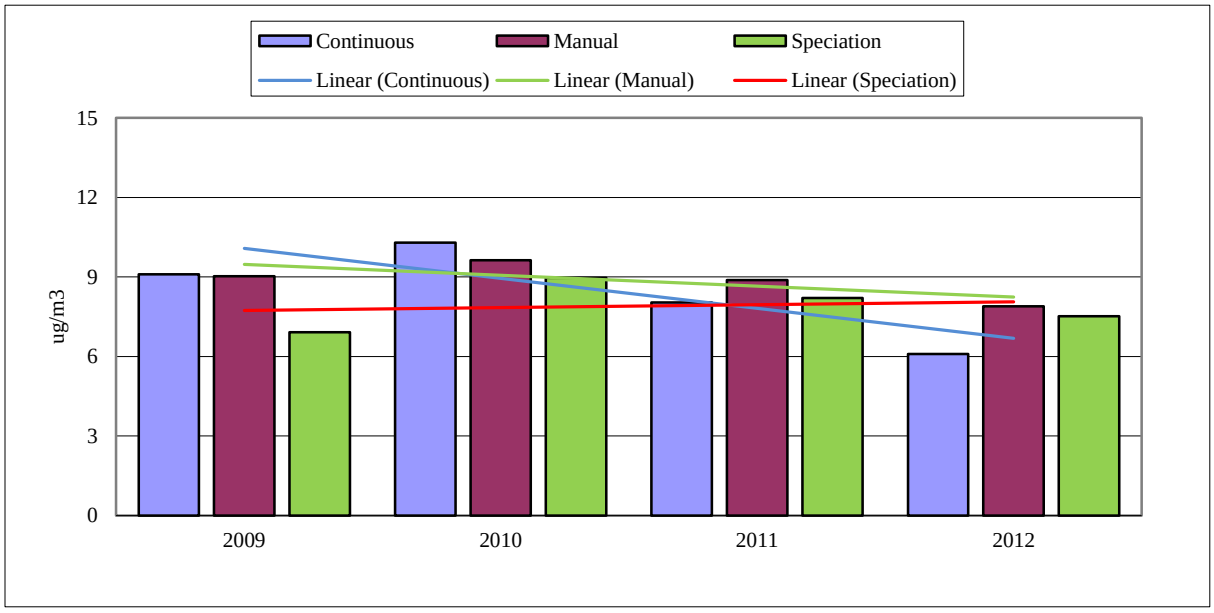


Figure 8-3 shows the average total organic carbon and elemental carbon concentrations for the URG model sampler. Concentrations of organic and elemental carbon in the samples are low with an average of 1.5 to 1.7 ug/m^3 per sample which is only around 20% of the total sample mass for fine particulate matter. The organic carbon concentrations on the average were slightly higher in 2012 than in 2011. The average contribution of elemental carbon to the overall concentration remained about the same from 2010 to 2012 and less than in 2009. The overall trend for total carbon shows a slight increase of the four years of testing.

Figure 8-3 - Average URG Model Sampler Total Carbon Concentrations

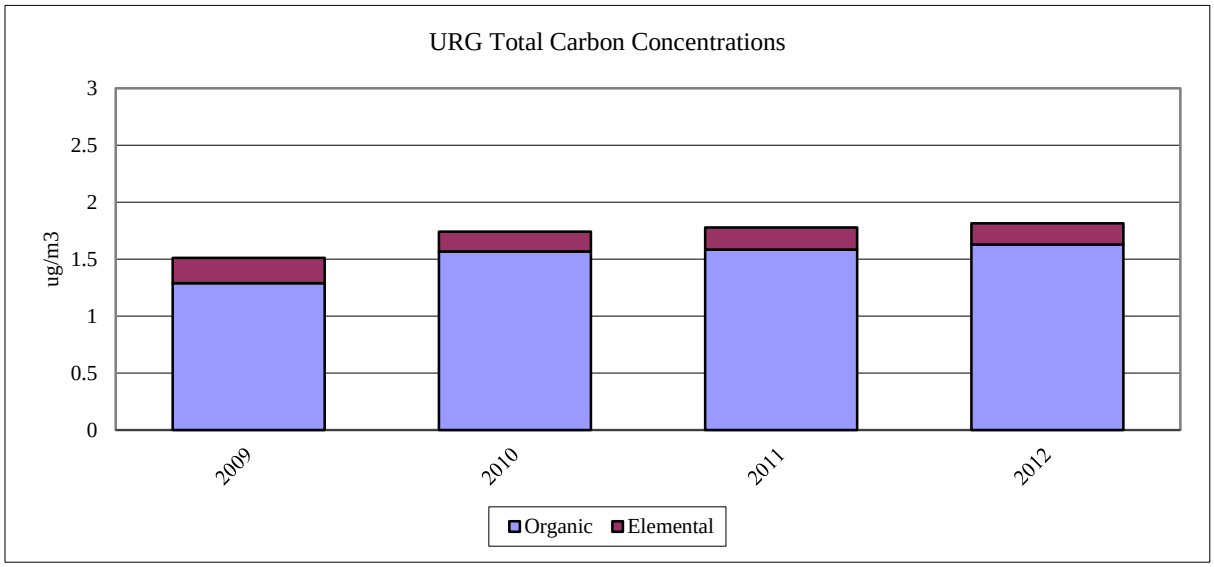
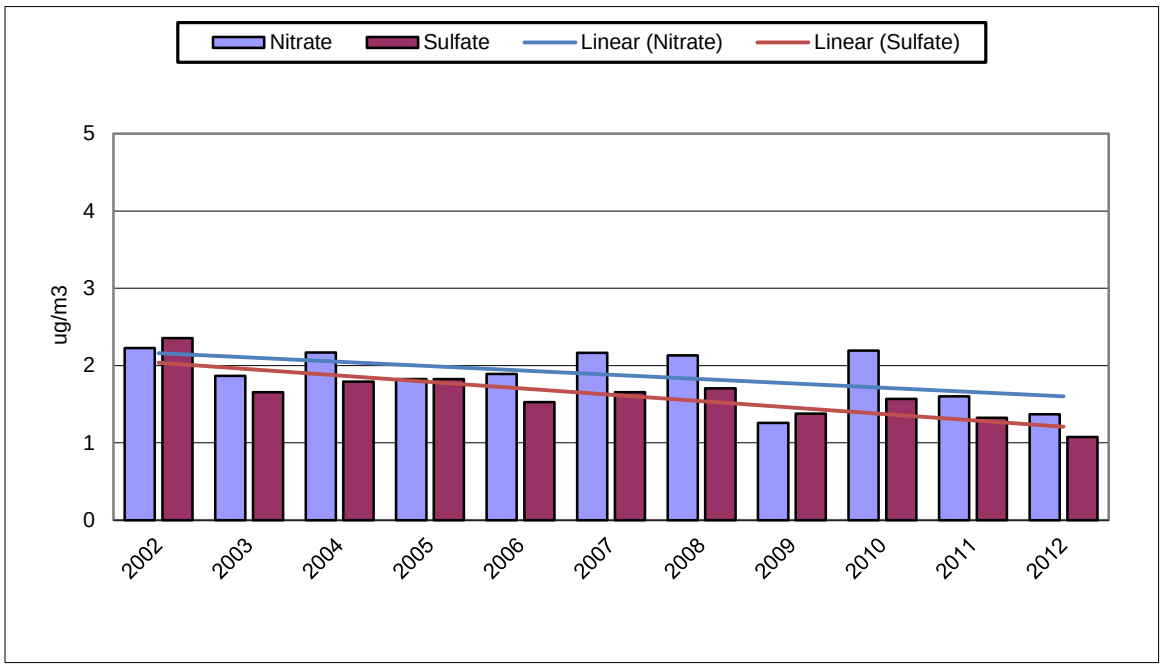


Figure 8-4 shows the average nitrate and sulfate concentrations analyzed from the $PM_{2.5}$ samples. The graph shows trends for the concentration of nitrates have fluctuated up and down over the last eleven years of testing; but are declining over the last three years of testing by 0.8 ug/m^3.

Sulfates in the $PM_{2.5}$ samples declined an average of 0.5 ug/m^3 during the last three years of testing. The trend line in the graph shows declining sulfate levels during the eleven years of testing.

Figure 8-4 - Average Nitrate and Sulfate Concentrations



9.0 REQUEST FOR WAIVER

There were no sampling frequency waivers requested for the 2013 sampling year and none are proposed for 2014.

10.0 CONCLUSIONS

The ambient air quality monitoring network has demonstrated South Dakota is attaining the federal NAAQS. The ambient air quality monitoring network is continually reviewed to ensure there is adequate coverage of populated areas in the state. As the state's population and industry changes, monitoring sites are added or moved to new locations.

There is an ongoing effort to maintain staff training regarding the latest monitoring techniques and procedures to perform these studies. It is anticipated the ambient air monitoring network will operate in much the same manner as it has in the past. This will include the identification of pollution problems, measurement and evaluation of the extent of the problem, and determination of action to be taken to protect the environment and the health of the people of South Dakota.

10.1 New Sites

The department will continue to evaluate the following areas for the need to modify the ambient air monitoring network:

1. With the change in deicing operations in Rapid City, the department will continue to evaluate the need for new air monitoring sites in the city if problems with dust are noted.

2. As monitoring rules and standards are finalized by EPA, there may be a need for new air monitoring sites based on the siting criteria EPA develops.
3. There continues to be a need to collect up-to-date concentrations in the rural areas of the state. This would be accomplished by setting up a new site if funding is available and test for four consecutive quarters to provide current background levels in areas such as the northwest and central parts of the state for all criteria pollutant parameters and the parameters of ozone, SO_2 and NO_2 in the northeast area.

10.2 Modifications

The department is planning the following site modifications:

1. The Thermo FH 62 C14 BETA monitors are reaching ten or more years of use and the current model is no longer being manufactured. These monitors require more maintenance and significant repairs to keep them operating. We have nine monitors total: six are 11 years old, one is 9 years old and two are 8 years old. As funding becomes available, these monitors will be replaced.
2. UC #1 Site will have collected carbon monoxide data a total of four years at the end of 2013. Sampling trends indicate little or no change in concentration levels. In addition, the concentration levels for the 8-hour average and 1-hour average are at 3% and 2% of the standard, respectively. The four years of data provides the necessary background levels that can be used for modeling or other needs for this area. This analyzer will be removed at the end of 2013 and used as backup equipment or setup at a new location.
3. The department also believes there is sufficient data from the National Guard Site to conclude the dust from the quarries are having minimal impact on the air quality in this area of the city. Therefore, the department will discontinue sampling for particulate matter (PM10) at this site at the end of 2013.

10.3 Sites Planned for Closing

The department has evaluated the data collected in Union County and determined only one site is necessary to evaluate air quality in the area. Based on the existing data, UC #1 is the best location of the two sites to represent air quality in the area. UC #2 will be closed at the end of 2013 sampling year. The monitors from the UC #2 site will be used to replace monitors at other sites or used as backup equipment if a monitor needs to be repaired or replaced.

11.0 REFERENCES

1 Environmental Protection Agency, May 1977. Quality Assurance Handbook for Air Pollution Measurement Systems Volume II, Ambient Air Specific Methods (as amended), EPA-600/4-77-027a, Office of Air Quality Planning and Standards, Research Triangle Park, N.C.;

2 Environmental Protection Agency, January 2003. Title 40 Code of Federal Regulation, Parts 50 and 58 (as amended), United States Government Printing Office, Superintendent of Documents, Washington, D.C.; and

3 Environmental Protection Agency, March 1998. SLAMS / NAMS / PAMS Network Review Guidance, EPA-454/R-98-003, Office of Air Quality Planning and Standards, Research Triangle Park, N.C.